THE AUTOMOBILE

WEEKLY NEW YORK—SATURDAY, NOVEMBER 12, 1904—CHICAGO 10 CENTS

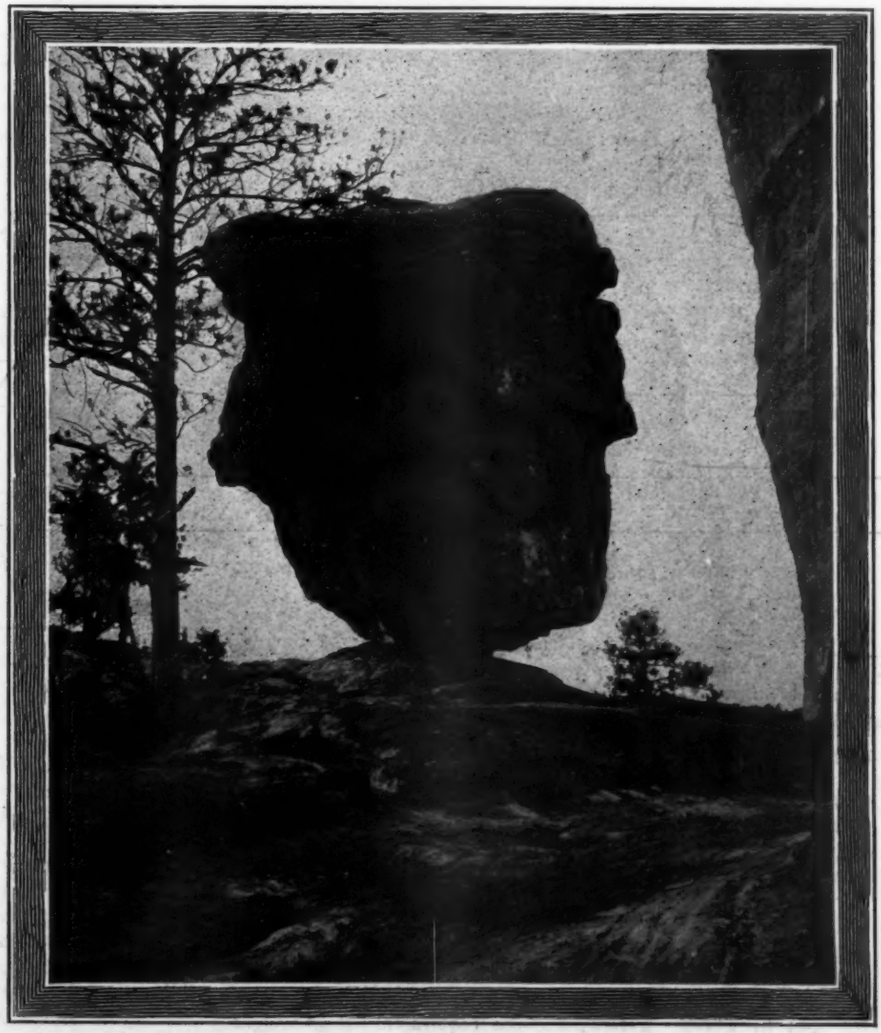
GROWTH OF AUTOMOBILING IN DENVER.

Special Correspondence.

DENVER, Nov. 5.—Nearly 600 automobiles are now owned in Denver, the "Queen City of the Plains," and a considerable number in addition are owned in the surrounding country by ranchers, who find them most convenient in traversing the long distances to the city. One fruit grower in the southern part of the State has forsaken the horse altogether for driving.

Situated on a level plateau a mile above sea level, fifteen miles from the glorious Rockies, with all of the streets inside of the city limits paved with asphalt and kept well cleaned and repaired, and with not more than four hills in the whole city, Denver offers unrivalled conditions for the enjoyment of the ownership of a motor car. Added to these conditions is a climate that is invigorating and delightful all the year around, and that, as everybody knows, is famed throughout the world.

Interest in automobiling here was early stimulated by wealthy tourists from the East, and became so great that two years ago the owners organized the Colorado Automobile Club, in order by uniting their influence to promote more effectively the welfare of the new pastime. This organization now has a membership of 250 and occupies a handsome suite of rooms at the corner of Seventeenth and Welton streets.



BALANCED ROCK, GARDEN OF THE GODS, NEAR MANITOU, COLORADO, ONE OF THE FAMOUS NATURAL PHENOMENA OFTEN VISITED BY AUTOMOBILISTS.

The club has started successfully several new enterprises, one of the most important being the construction of an automobile road from Denver to Colorado Springs, a distance of between 75 and 80 miles. This road is to be used solely by automobiles and will be under the jurisdiction of the club. One portion of it is to be set aside as a speedway. The club also has prepared plans for grading the Boulder Canon road, which is now only a trail following the canon and river far up the Continental Divide. It traverses what is without doubt one of the grandest parts of the Silver State from a scenic standpoint, passing from the very plains into the realms of perpetual snow, skirting the banks of one of the prettiest streams in the State, which it crosses and recrosses.

Plans are now in preparation for a new automobile race track to be completed by next spring. It is intended to make it one of the best tracks in the country, as the club is anxious to take a foremost place in the promotion of this sort of sport. Up to the present it has held its racing events on Overland track, where

some record-breaking times have been made, including those by Barney Oldfield with the *Bullet No. 2*, made last October, and those made to-day by the same driver with the *Green Dragon*.

The officers of the club at the present time are: President, D. W. Bunton; vice-president, F. L. Bartlett; secretary, W. H. Bergfold, and treasurer, A. B. Daniels.

To the president of the club belongs the distinction of being the first citizen to bring an automobile to Denver. He came here in the spring of 1900 with a Mark III. Columbia. His example was soon followed by G. L. Stone, who bought an Oldsmobile through a local firm, and in the same summer several other new cars appeared in the city. No repairman had yet entered the field, and considerable difficulty was experienced by the owners in getting broken parts repaired and replaced, which dampened their enthusiasm somewhat. But several enterprising dealers in bicycles and sporting goods were alive to the opportunity and wasted no time in securing agencies for automobiles and equipping their shops to handle the repair work, so that automobiling developed rapidly the following year. In the spring of 1904 new cars to the number of 200 were sold here—a remarkable number for a city of 145,000 population. The cars that seem to be most popular here are the Peerless, White, Olds, Winton and Cadillac.

Denver has several drivers who are becoming well known through their achievements on the track. G. W. Maxwell gained great popularity by winning everything in sight at the recent meet of the Colorado Automobile Club. George Hering broke some of the track records with his Stanley *Comet* at the July meet, reeling off miles in one minute and less. E. W. Swansboro and E. L. Mathewson have also made a good impression by their clever handling of cars on the track.

Local dealers in automobiles are looking forward expectantly to a long list of sales next spring. A number of orders have already been placed for delivery as soon as possible, the winters here being so open that cars can be used with comfort all through the winter months.

The principal dealers engaged in the automobile business in Denver are the Felker Cycle Company, the Colorado Automobile Company, the Rambler Automobile Company and the White Sewing Machine Company. The Auto & Cycle Motor Company, which handles a large part of the repair work, has one of the largest and best equipped repair establishments in the West.

Tourists from the East who contemplate spending the winter in a climate that is comfortable and healthful, and in which motoring can be enjoyed all through the winter, will find here every facility for pleasant indulgence in the pastime, with the additional attractions of magnificent scenery, superior accommodations, and social and intellectual entertainment.

Energy of Impact in Collision.

FROM THE FRENCH OF A. BECKER, C.E., IN *LA NATURE*.

MOST road accidents proceed from the same cause, a sudden stopping of the vehicle when at full speed. If it is a horse-drawn vehicle, the animal, after rushing on, may strike some obstacle and be thrown down exhausted; in the case of an automobile the organs are disarranged by some wrong movement, or from striking against a post, tree, or other object; the driver, or chauffeur, as the case may be, is thrown like a projectile on the road, and his injury is proportioned to the speed of the vehicle.

It may be useful to analyze the effects of such accidents. Consider, for instance, an automobile going at the rate of 30 kilometers (18.63 miles) an hour, a speed which is often exceeded, but which is suitable for study, because it represents the maximum allowed by the ordinances; the velocity is 27.3 feet per second. If for any cause the automobile is arrested suddenly, the movement if the passenger continues at this initial velocity of 27.3 feet, and if the front of the vehicle, against which he may strike, does not modify the kinematic conditions, he will describe, under the action of inertia on the one hand, and of gravity on the other (neglecting the resistance of the air) a parabola whose apex will correspond to the starting point of the trajectory. In case the centre of gravity in the body of the vehicle starts at 1 1-2 metres or 4.92 feet above the ground, the point of impact, or point of intersection of the parabola with the line of the ground, supposed to be horizontal, will be 15.3 feet distant from the starting point. The duration of the course of the trajectory will be half a second, and the speed at point of impact will be 32.5 feet per second.

The body, at the moment when it meets the ground, which is supposed to be incompressible, loses instantly its stored energy, $1\text{-}2\ m\ v^2$ (m being its mass, equal to its weight divided by 32.2, approximately, and v its velocity). For a weight of 75 kilograms (165.4 pounds), and a speed of 32.5 feet, the energy spent will amount to 2,720 foot pounds. If we consider that this is equivalent to the work performed by a weight of 272 pounds falling 10 feet, the veritable work of a pile driver, and that the shock is not generally distributed over the whole surface of the body on the ground, but felt at certain points only, the serious consequences of the fall may be understood.

The formula $1\text{-}2\ m\ v^2$ for the energy also shows the enormous influence of the velocity of the fall, as we have seen, considerably exceeds the velocity of the projection; and the (equivalent) dead weight is proportioned to the square of the velocity of the fall. It may, therefore, be said that the danger of automobile accidents increases more rapidly than the square of the velocity, if we understand by danger, *not the probability* of accidents, but the gravity of their consequences. Representing by 1 the danger corresponding to a speed of 10 kilometers (6.21 miles) per hour, it is seen that the danger will be represented by at least 36 for a speed of 60 kilometers (37.25 miles), and by 144 for a speed of 120 kilometers (74.5 miles) per hour. The progression is frightful and might well cause chauffeurs to reflect on the temerity of launching themselves at the speed of rapid trains on roads filled with obstacles.

Yet it would not be difficult to prevent by simple and practical means the effects of projection from carriages and automobiles. It will be sufficient for the driver or chauffeur to be kept on his seat by a belt or strap passing round his waist and hooked at each end to the end back of the seat; but since at the moment of a sudden stop, his body, projected forward, might receive an unpleasant strain, a spring should be introduced whose tension or compression, according to the arrangement adopted, would absorb the energy of the shock, and afterwards gradually restore it without injury. If we had detailed statistics of the circumstances of these accidents, they would certainly demonstrate that in rainy weather, though the horses may be more likely to fall by slipping, accidents to the drivers are not so common, on account of the leather aprons drawn over the limbs and attached on each side to the back of the seat, assisting them in maintaining their position.

The above treatment of the subject by the author, while very interesting, and stating the scientific facts involved, is made wholly from a theoretical standpoint, and the conditions as discussed are not always duplicated in practice. For example, the fall of a passenger in the event of a collision, where the space in front of the car is unobstructed, is not usually arrested instantly, for the reason that the direction of the fall is not perpendicular to the ground. He will therefore roll or slide instead of being crushed by his own momentum.

As a matter of precaution, the same in an automobile as in a horse-drawn vehicle, a passenger on the front seat may protect himself from being unexpectedly deposited on the roadway by keeping his feet braced against the foot rail. When in this position, should the driving wheels lock, through the seizing of a bearing or by the sudden application of the emergency brake, he will be able to retain his seat. In such cases the stored energy will be largely expended in sliding the car along the ground.

It may be doubted if the suggestion of the spring belt is of much practical value, as the spring would have to be very short, and at the end of its extension it would jerk the unhappy passenger back again with a velocity equal, theoretically, to that of his motion at the instant of collision. Most per-

sons would sooner take their chance of falling clear. The driver in a wheel steered car has a chance to brace himself with his hands on the wheel, and in his case the strap would be superfluous.

Those who drive continually within the speed limits and with intelligence—as for example, slowly on dark nights when without gas lamps—need not have any apprehensions on the score of unavoidable collisions.—EDITOR'S NOTE.

The Cleveland police are on the lookout for a miscreant who has the playful trick of suspending a wire across streets frequented by automobilists. A few evenings ago a well-known automobilist was severely injured and his machine damaged by a trick of this kind. The wire was stretched across East Prospect street just high enough to clear the body of the car, but low enough to strike the automobilist in the face. The wire lifted him clear off from the seat, turned him over and hurled him into the street. The car went charging into the curb and brought up against a tree considerably damaged. The police found the wire, but it was broken. They do not know whether someone was playing premature Hallowe'en pranks or whether the trap was placed deliberately for motorists. East Prospect street is one of the most popular streets in the city for automobilists, and on pleasant evenings hundreds of cars, many operated by women, pass up and down the smooth asphalt pavement.

Kansas City-St. Louis Roads.

The photographs in the accompanying engraving give some idea of the nature of the roads from Kansas City to St. Louis. They were taken by Henry C. Merrill, of the Kansas City Automobile Company, on a trip made by himself and H. N. Strait, Ralph Baker, W. G. Whitcomb and H. C. Blakeley in White steamers to "prospect" the route for the benefit of those who might make the A.A.A. tour to St. Louis. Brief accounts of the difficulties met on this run were published in THE AUTOMOBILE for July 16. The "pathfinders" themselves, after their return home, declared in favor of another route than the one they followed through Boonville, Warrensburg, Rockeport, Columbia, Warrenton and St. Charles. And after a study of the pictures this occasions no surprise. Even the roads that the New York and Boston contingents in the tour encountered in the Mohawk Valley must seem good by comparison. Conditions could hardly have been worse than at the time when the run was made. The weather had been fair for a week before the start, but beginning on the very day the party left Kansas City and continuing while the motorists were on the road, it rained, not in sprinkles, but in large drops and plenty of them. Half the roads were of rock and water could hardly make them worse. Dirt roads became bottomless in twelve hours and navigation is the only term which properly describes the manner of progress of the tourists. Swimming, wading, using fence rails for crowbars and road surfacing, borrowing horses and sometimes pushing their own cars, the motorists pushed on until they finally reached St. Louis.

Tire troubles were the greatest annoyance. On one car a spring and a steering knuckle were broken, but there were no more serious mishaps.

Stop on a Good Road to Fill Tanks. An Alleged Road near Rockeport.

Over the Hubs in a Bottomless Prairie Road. Along the Brink of a Caving River Bank.

CHARACTERISTIC ROAD SCENES IN MISSOURI ON ROUTE BETWEEN KANSAS CITY AND ST. LOUIS.

Fast Times in Gaillon Hill Contest.

Special Correspondence.

PARIS, October 31.—Every one will remember when in March, 1902, an automobile, a Serpollet steamer, for the first time made a time of less than half a minute for the flying kilometer at Nice. Well, yesterday four vehicles, one of which was a mere motor bicycle of less than 110 pounds weight, exceeded this speed on the Gaillon hill, the average gradient of which is over 7 per cent.

Indeed, the performance shows that for the present day's vehicle the air resistance is much more of a hindrance against high speeds than the gradient; the well known Commandant Frejus having just showed us the figures by which he proves that in this particular case the gradient was only one-ninth of the total resistance.

This fact, however, should not decrease in any way our admiration for these wonderful vehicles, so much faster than the fastest railway engines, within such narrow weight limits as those which restrict their size.

The Darracq cars took the largest share of the success of the day, since they won in the three classes (heavy cars, light cars and voiturettes) with ease, beating all previous records in two of these classes and making the same time as previous record in the third.

The winner of the first class, Barras, took 29 seconds to climb the kilometer, being a speed of 77.13 miles an hour. He certainly would have done much better had not he been bothered by a series of misfires before the start and for the first seconds of his run. This consequently leads one to consider his car as fast as that of Rigolly, who on his faithful Gobron-Brillié could not do better than Barras, the contest being a dead heat.

It was La Franchi, the famous Dourdan winner, who on his motorcycle climbed the hill in 29 3-5 seconds, or more than 121 kilometers an hour, which performance is almost the same as he made on a level road at Dourdan, with but two kilometers an hour difference.

The forenoon had been reserved for the tourist's class. Very fine performances were made by most handsome vehicles, but unfortunately they are very much shaded by the startling climbs of the racing cars. In fact, it is a pity that the old policy of holding the touring and the racing events on two different days had not been adhered to this year. The idea was very satisfactory, since it gave the public a chance to watch and appreciate both kinds of performances without diverting interest from one to the other.

Hundreds of cars had come to Gaillon to witness the races, the road leading from Paris there being one of the finest in France, although very dusty after our present dry spell. No accidents of any kind marred the events.

Following are the summaries:

RACING CLASS.

Heavy Cars—First, Barras (Darracq), Rigolly (Gobron), dead heat; :29 3-5; previous record, :33 3-5.

Light Cars—First, Hemey (Darracq), :32 3-5; previous record, :38.

Voiturettes—First, De la Touloubre (Darracq), :40; same as last year.

Motorcycles—First, La Franchi (Peugeot), :29 3-5; previous record, :41.

Notice the tremendous jump of the record for this last class.

TOURING CARS.

First Class—De Lareinty (Mercedes), :50.

Second Class—Rulot (Steamer), :62 3-5.

Third Class—Cuchelet (Peugeot), 1:17 1-5.

Fourth Class—Pelser (Steamer), Chenard (Gasoline), 1:33.

Fifth Class—Motorcycles of not more than 1-3 liter cylinder capacity, Colomb (Magali), :55 3-5.

Chateau-Thierry Hill Climb.

Special Correspondence.

PARIS, Oct. 26.—Touring cars only competed in the third annual Chateau Thierry hill climbing contest held last Sunday, under the management of *L'Auto*. Since the maximum gradient is only 10 per cent. and there are several sharp turns in the mile course that are dangerous to take at high speed, the promoters had decided to exclude the racing cars, more especially as the Gaillon hill trials were set for only one week later and offered a more suitable course for the powerful and fast racers.

The line of demarcation between racing and touring cars has heretofore been so indefinite that the same machines have competed in both classes, the especially built cars being fitted with extemporized bodies to make them eligible for the touring car class. Stringent rules prevented this in this year's contest, the competitor being required to present to the race commission a certificate from the maker of the car giving the number of the engine, the bore and stroke, and declaring that the motor was exactly the same as those regularly installed in touring cars selling at the advertised price. Moreover, the body must bear a reasonable ratio of cost to the chassis, and the ratio of weight of the entire vehicle to the cylinder capacity was taken into account.

Classification was by price, somewhat of a novelty this year in contrast with the old categories by weight alone. But no distinction was made between gasoline and steam cars. The only steam cars that took part were four of the Gardner-Serpollet production, which were entered in as many different classes—in which, by the way, they all took first place, showing the advantage possessed by the steam car in not too long hill climbing. They made the ascent in from twelve seconds to one minute better time than the fastest gasoline cars.

Despite the elimination of the more spectacular racing cars, which might have been expected to take away from the interest in the contest, there were seventy-four entries for the event, of which sixty-three were on hand for the start. Before the hill climb, the competing cars were judged by a special committee which classed them with regard to cost and set time limits for the several classes as follows: Motor bicycles, 5 minutes; 4,000 franc ($800) cars, 10 minutes; 8,000 franc ($1,600) cars, 9 minutes; 12,000 franc ($2,500) cars, 6 minutes; 18,000 franc ($3,600) cars, 5 minutes; 25,000 franc ($5,000) cars, 4 1-2 minutes; 40,000 franc ($8,000) cars, 4 minutes; more than 40,000 francs, 3 1-2 minutes.

A new category was also established, for cars with permanent closed bodies.

The weather was good and the times made were excellent, all but one being well within the time limits set, and the performances of the many cars showing much less variation than in past years.

While the two Mercedes cars in the class for cars costing more than 25,000 francs made the best time among the automobiles, Larenty-Tholosan making the ascent in one in 1:42 2-5, and De Graves in 1:50 in the other, one of the surprises of the meeting was the Magali motorcycle, which, with a cylinder capacity of but one-third of a liter, and weighing 111 kilograms (244 pounds), climbed the hill in 1:43 4-5, only 1 2-5 seconds more than the 60-horsepower Mercedes. The Gobron-Brillié made the best time among the gasoline cars in the class for cars costing from 4,000 to 8,000 francs, Meyer's time being 2:50 2-5. Walcker, on a Chenard-Walcker, made the next best time to the Gardner-Serpollet in the class for cars from 8,000 to 12,000 francs, his time being 2:39 1-5. Cuchelet in a Peugeot was second to Pelser in a Serpollet in the class for cars from 12,000 to 18,000 francs in 2:13, and in the closed body class, Barthelemy in a Berliet was first in 3:28.

A successful track meet was held late in the season at Hamburg, Germany, by the North German Automobile Club. The chief event—an international race at 6,500 meters (4.036 miles), was won by Hemery on a 40-horsepower Opel-Darracq, in 5:12, with Willy Poege, on a 38-horsepower Mercedes, six seconds behind, and Hieronymus, on 24-horsepower Spitz, third. It will be remembered that Hemery started in the British Gordon Bennett trials this year without success, and that F. Opel broke down in the cup race itself. Hieronymus's car was built by himself. With it he won, at the same meeting, the opening race, at 4,000 meters (2.48 miles), for small cars not exceeding 400 kilos (881 pounds), with F. Opel second in a 16-horsepower Opel. Hemery also captured the 4,000-meter race for the Lurup cup, for cars weighing 400 to 650 kilos (881 to 1,432 pounds), in his 40-horsepower Opel-Darracq, his time being 3:13.

ANALYSIS OF PERFORMANCES IN VANDERBILT RACE.

PERHAPS the Vanderbilt Cup race held on Long Island October 8 has awakened the American automobile world from the useless dream that the purpose of an automobile race is to demonstrate speed—which is nothing more than a function of power, weight and air penetration.

On the race track, the ash-strewn ice track, the water-level beach track, speed is that function, and little or nothing more, a mere mathematical quantity calculable in advance.

Speed the Measure of Stress.

But on the highways, with their irregularity of surface, speed becomes something additional, namely, the measure of stress and abuse. The question in an automobile road race is not, "How fast can you drive your machine?" but "Which one of these machines can be most abused without going to pieces?" The road is alike for all; the bumps received are severe in proportion to the speed. The drivers are the most skilful and daring to be found, and therefore supposed to average out about equal; they all know the operating mechanism of their respective cars. Which of these mechanisms is most suitable? The one which obeys implicitly at the shortest notice. The faster the car is driven the more quickly all changes in operation must be made. Hence speed becomes the measure of the car's manageability. But only on the highways with their irregularities.

Breed Produces Speed.

In horses energy is the mysterious quality of breed which produces speed. The energy is the desirable quality, but, owing to the shortcomings of our insight, we must breed for that sign of it which we are able to recognize and appreciate according to its degrees. If we knew more we could breed for energy direct.

In automobiles no mystery surrounds the factors which produce speed *per se;* they are entirely under our control. Great power and small weight produce it unfailingly. No need of races for discovering that. The mystery lies at another point. Stamina! By what artful combination of rigidity here and flexibility there may we reach the heights of perfect reliability and durability for the automobile. Here the road race helps out our intellect and art.

The breakdowns and accidents of the road race are the insurance premium paid to avoid breakdowns and accidents, a hundred times more numerous, in the daily automobile traffic.

Intellectual Limits of Design.

If automobile designers possessed infinite ability and knowledge, they could design perfectly reliable automobiles, of the light weight and graceful lines which the public demand, from the stress sheets of the draughting room. But designers are only human. Automobiles so designed have always proved to be traps.

There would be another method than that of the road race for reaching perfection in construction details were it not for the compulsion of commercial competition. The automobiles could be built with safe dimensions of all parts, trusting to the verdict of time for acquiring the knowledge that would permit cutting down the excessive weight. Competition prevents this.

Weight in a road vehicle, especially one supported on air-inflated tires and intended for roads with steep gradients, has so many intrinsic and incidental disadvantages that manufacturers must avoid it if they shall expect to succeed in commerce. In order to find out quickly how to reduce the weight and, maintaining the stamina, the reliability and durability, there is left only the "test to destruction"—the road race.

Influences of Weight.

This is so especially because weight at any one point in a machine which is bumped around over all kinds of roads does not only *afford* strength at the point where applied, but it also *exacts* additional strength of all other parts of the construction, and to such a degree of complication does this mutuality attain that it becomes exceedingly difficult to determine in advance whether an addition of material and weight at any one or more points will strengthen or weaken the construction as a whole.

The road race—the test to destruction—determines this difficult question better than any other expedient devised. The determination is not absolute, but it is highly valuable, and where it leaves loopholes of uncertainty there sport enters. Sport demands uncertainty and chance. Sport permits us to hold tests to destruction and to get some returns for their excessive cost in the form of publicity, as well as in those hints for the improvement of the automobile "breed" in the benefits of which the industry at large eventually shares with the enterprising ones who hold the tests.

The Test to Destruction.

A test to destruction which never destroys fails in the purpose which justifies it. If nothing breaks or goes amiss in a road race that race is a failure. Either it has been held under mild, unrepresentative, and therefore meaningless, road conditions, or the speed has been too low. Competition for sporting honors, and all they mean in emoluments, among the drivers, will take

(*Continued on page 546.*)

HEATH, IN THE WINNING PANHARD CAR, GOING AT FULL SPEED ON THE HEMPSTEAD-JAMAICA PLANK ROAD.

GRAPHIC HISTORY OF THE PERFORMANCES OF COMPETING ON LONG ISLAND, NEW

DATA COMPARED AND CURVES

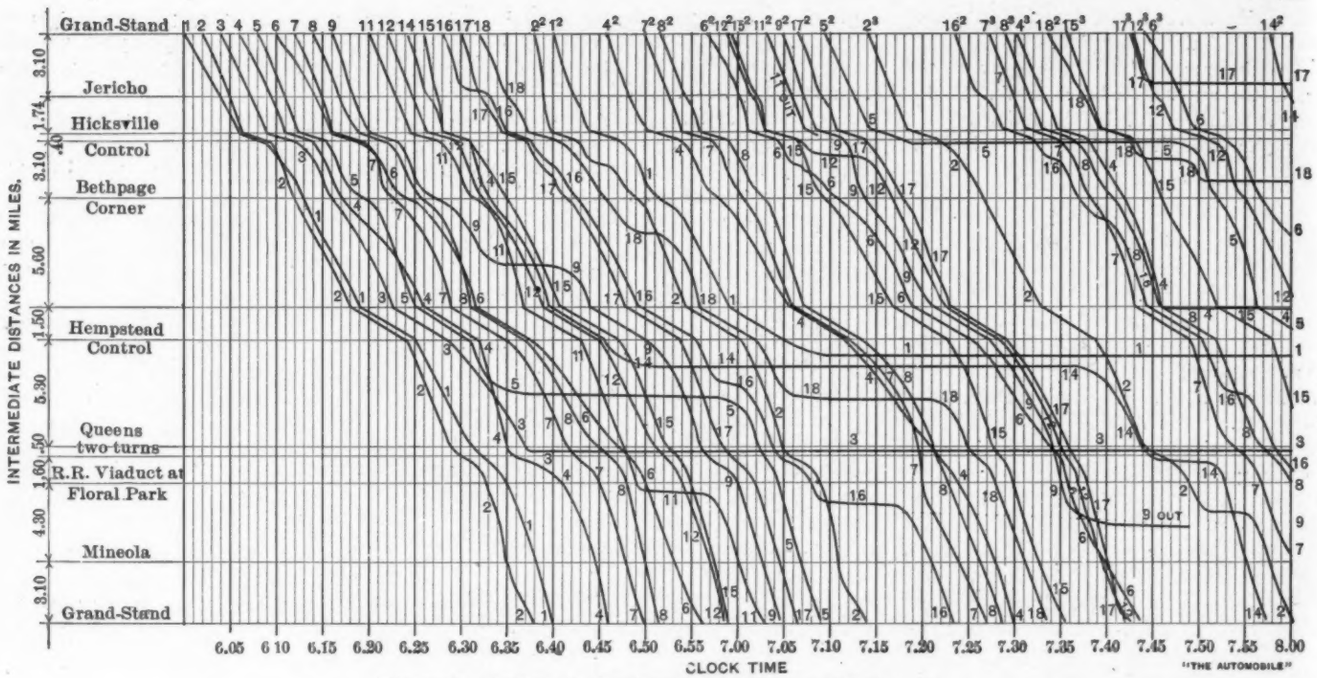


Diagram I.—Positions of Cars from Start of Race until 8:00 A. M.

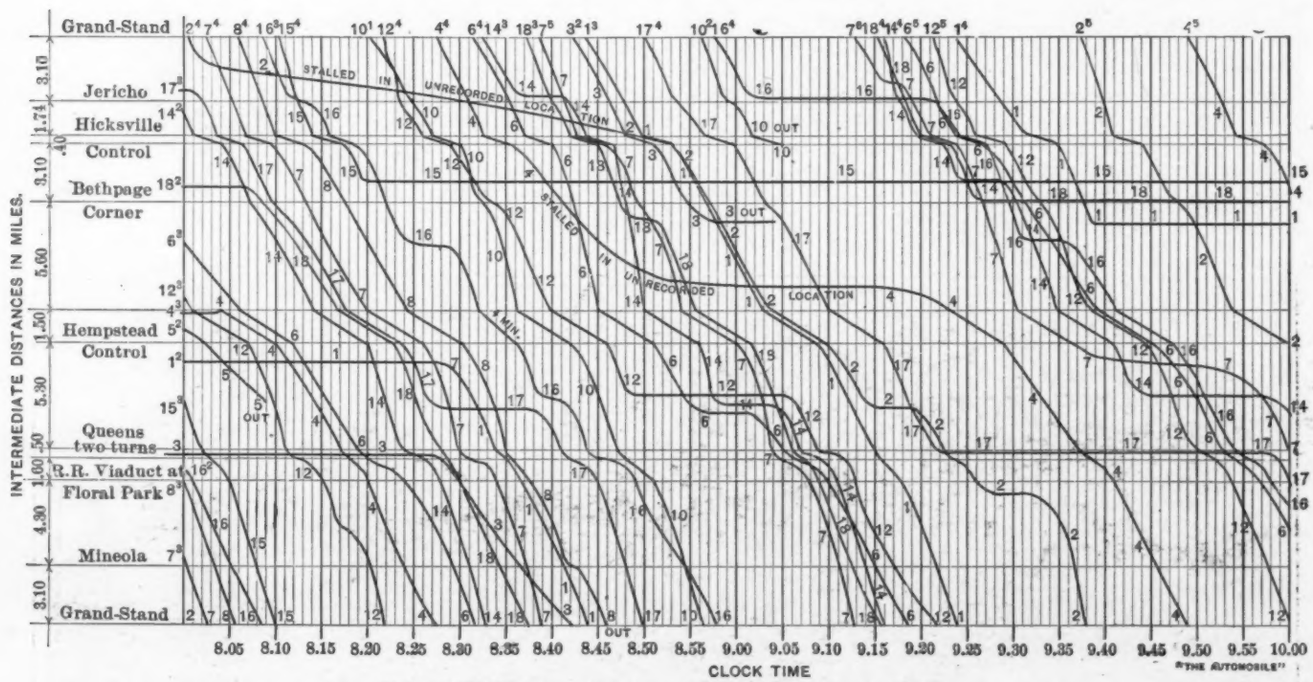


Diagram II.—Positions of Cars from 8:00 A. M. until 10:00 A. M.

Note.—In reading the tables the vertical lines represent divisions of time into one minute periods, the heavy lines marking each five minutes period, as expressed in figures below the table. These figures are the official clock times as recorded on the day of the race. The horizontal lines represent the points at which the observations were made and the intermediate distances will be found at the left of the table in miles and decimal fractions of a mile. The curves exhibit the progress of the cars during the race, horizontal measurements showing elapsed time and vertical measurements the mileage covered. It follows that where a curve changes into a horizontal line the length of the latter represents the time the car was at a standstill. The exact location of stoppage between points

CARS IN THE WILLIAM K. VANDERBILT, JR., CUP RACE YORK, OCTOBER 8, 1904.

PLOTTED BY MARIUS C. KRARUP.

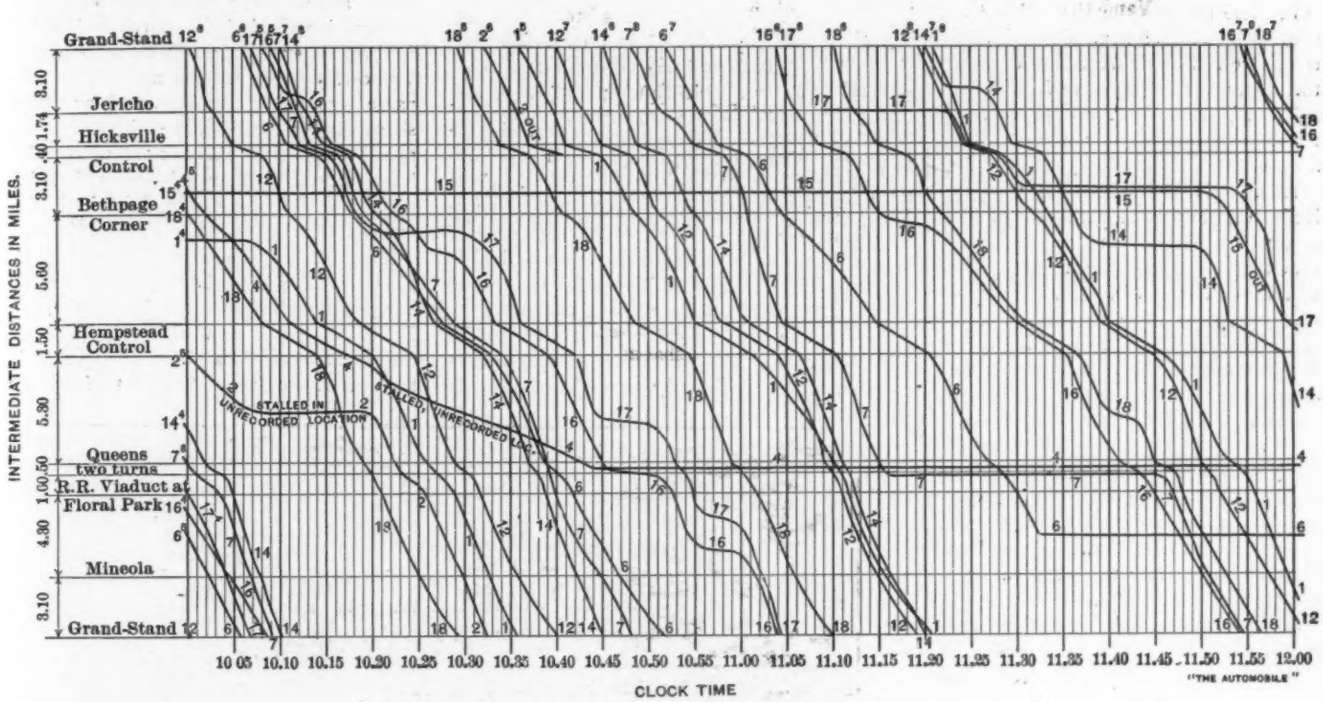


Diagram III.—Positions of Cars from 10:00 A. M. until Noon.

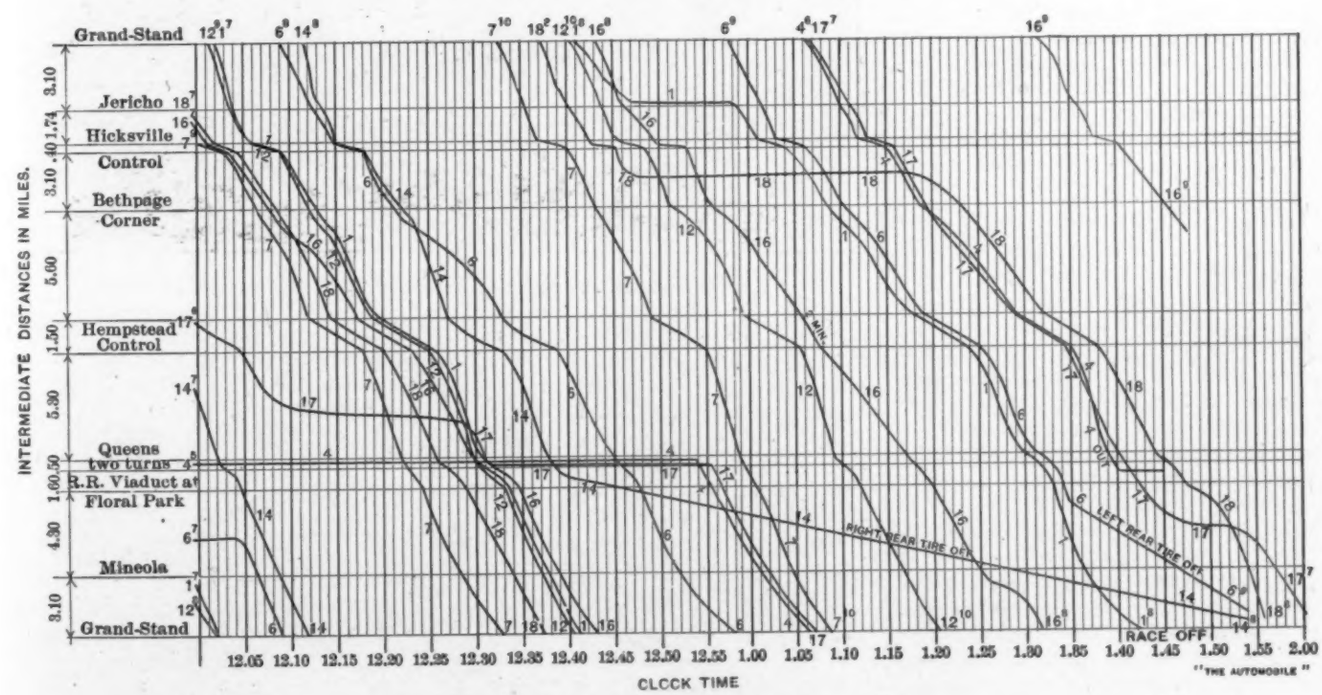


Diagram IV.—Positions of Cars from Noon until End of Race.

of recorded observation has, of course, been assumed empirically. For the consideration of car performances such locations are unimportant. Each curve is identified by its official car number placed close to the left or right of it. The "superior" figures explain in all cases the number of the round which the curve illustrates. Each table represents a complete loop of the course in distance, and where a curve ends at the bottom of the table the car has completed a round. By following up the vertical time line from such ending the start of the car on the next and following round is found and this can be repeated until the car has finished or dropped out at some intermediate point of the course.

care of the speed being high enough, as experience has shown. The organizers of a race must take care that the road is rough enough and representative of road conditions in the country whose benefit is mainly in view.

THE RACE A GOOD BEGINNING.

In these respects the Vanderbilt Cup race proved a suitable beginning of American road races. Speeds were high enough to be thrilling, and troubles were frequent enough to show possibilities for improvements and refinements in design or work. It was not a superfluous race.

Heath's winning of the cup was instructive. Teste and Tart with cars of identical design attained much higher speeds at times. They made the test to the limit where destruction began, while Heath warily kept as close to that limit as possible, but just below it. It is for the manufacturer of the three cars to analyze this interesting result, as they undoubtedly will.

Other manufacturers represented will have no difficulty in locating the comparatively weak spots in their products from the results, if these are laid before them in a manner that allows them to follow up every delay that occurred on the road and enables them to investigate the cause in each instance.

Such a presentation of the results of a road race has never been attempted, either in Europe or here, but it is given as nearly as possible under the circumstances in the four accompanying charts, showing the speed of every contestant at all points of the race by the direction of the curve representing his car, his relation on the road to any and all of the other contestants at any time and in any place in the race, his delays and the time required for repairs, and the final outcome of the contest.

THE TIME RECORDS.

The course was officially timed by the Chronograph Club of Boston only at three points, the start, Hicksville and Hempstead, and several errors in a few cases have crept in, but checkers were placed all around the course in many places. If they had always taken the time of the passing contestants and had been provided with synchronized watches, more than sufficient material would have been produced for securing accurate charts with a minimum of work. They could, in fact, have been laid before the public on the day after the race.

As it was—most of the checkers taking no time, but only checking the passage, and others having unreliable watches—much comparison of material has been necessary, and, even so, the exact location and duration of repairs have not always been determined with as much accuracy as would be desirable. Each contestant will probably be able to make slight changes for greater correctness in his own curve.

Every point in these charts represents a location and a time combined. The course, ten times repeated in this instance, runs from top to bottom. The time runs from left to right. Where the Queens line crosses the 8:30 o'clock time line, for example, there is shown what took place at Queens at 8:30 a.m. The eye picks out the point, the location and the time, and the curves at and around that point, representing the progress of the cars in the race, immediately respond with a story. Or the eye specially interested in one of the cars or one of the chauffeurs picks out the corresponding curve and follows it from beginning to end. All the happenings stand revealed: Where the car went fast, where slow, where stalled, when and where overtaken by another car. No other form of record asks so many questions and insists on their answers, and herein lies the reason why the charts were made in this case.

These charts should make it plain to the road race critics that the numerous delays and repairs indicated where the curves run horizontally or slanting at low angles to the right, are exactly what must be expected of a long-distance road race and exactly what ought to disarm opposition to such races. Every one of them furnishes some indication of a weakness, which would be revealed to the owner of an automobile probably not in less than a year's time and at his cost, but which the road race in its daring exaggerations of nearly all destructive factors—barring only rust and neglect—reveals at once, publicly and at the cost of the manufacturer.

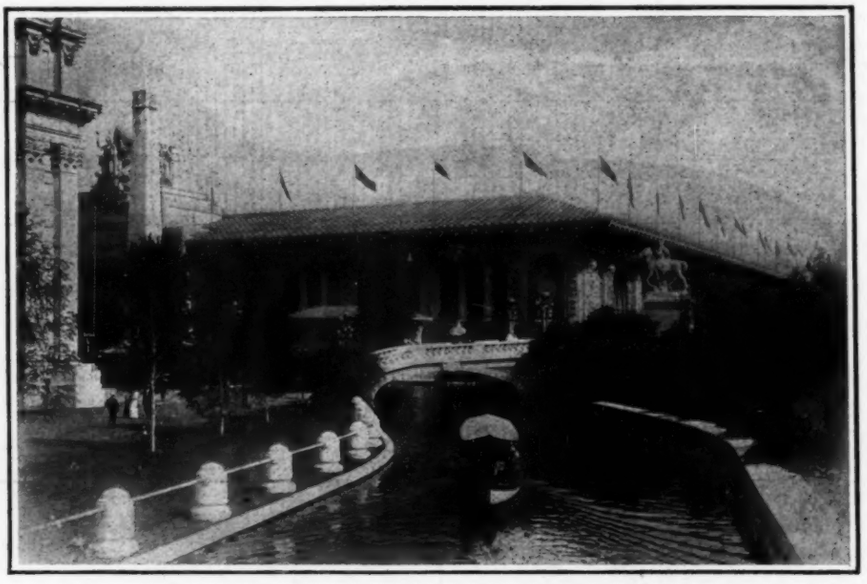
Since the passage of the automobile ordinance there sixty-five motor cars have been registered with the city recorder of Jacksonville, Fla.

Rensselaer is just now all swelled up over a new automobile, the second one to be owned in that town.—*Remington (Ind.) Press.*

Power Boats at St. Louis.

Power boats, both gasoline and electric, are a popular feature of the lagoons at the St. Louis World's Fair, and are to be seen not only in the conventional form, but in the guise of swans, peacocks and sea-serpents, all, however, being built on the ordinary form of hull. These fancifully formed boats are driven by 2 1-2-horsepower Truscott gasoline motors, and will carry 25 passengers each. The lagoons form a chain shaped like a figure 8, the distance for the round trip being about 2 1-2 miles. The boats are well patronized during the afternoon, and the view of the Fair obtained by making the trip is particularly fine.

The electric launches, which require charging after each day's work, gather under the stone bridge at the foot of the West Pavilion, where, on a platform built over the water, there is a rheostat, from which the batteries of the entire fleet of 32 boats may be charged at the same time. The platform is not housed, but is protected from the rain by the bridge overhead. The boats are charged in series of two from a 250-volt circuit, and from 6 to 8 hours is required for a full charge. Each boat carries 44 cells of 140 ampere hours capacity. Charging time is from midnight to 7 o'clock in the morning, the work going on silently and steadily while the great Exposition is asleep.



A WORLD'S FAIR POWER BOAT ON ONE OF THE PICTURESQUE CANALS.

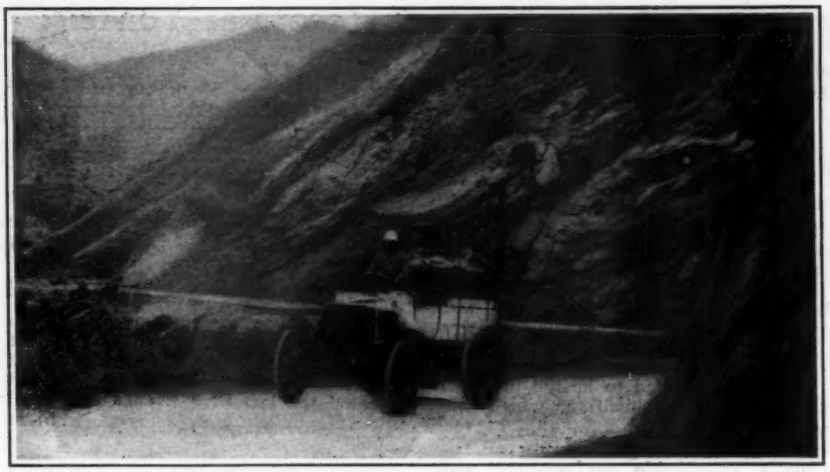
Prince Henry of Prussia is the latest recruit to the ranks of royal motorcyclists.

Light automobiles of American manufacture are finding a ready market in England.

The fact that gasoline launches are being used for duck shooting in Toronto Bay has been brought to the attention of the chief game warden. This practice being illegal, the sportsmen have been warned that prosecution will follow a continuance of it.

Postal Service Autos.

It is a tribute to the state of efficiency to which the modern automobile has been brought that it should be selected by government officials for the exacting service of mail transportation, and a further indication of progress that its use for this purpose is steadily increasing. Three different types of motor-propelled vehicles, all engaged in postal work, are illustrated herewith. The motor tricycle is used in Buda Pesth, Hungary, for collecting mail matter from letter boxes, and is fitted with a frame behind the saddle on which the mail pouch is carried, protected from rain by a curved sheet metal guard. The large gasoline automobile, photographed on a mountain road, is one of six postal vans which have been in constant use for seven months, giving excellent satisfaction. Their route lies between Tamatave and Mahatsara, Madagascar, and during the time they have been in service no less than 106 tons of mail matter have been carried over the mountains, and an aggregate distance of 30,000 miles covered at a total expense of $18,000. So great is the amount of mail matter passing over this route that four more cars are to be added. The electric postal vehicle is one of the machines used in the postal service in Paris, where it might be expected that the automobile would find a ready entrance into almost any class of service. It will be noticed that on the two heavier vehicles illustrated pneumatic tires are discarded in favor of the more reliable, if less luxurious, solid tires.



PANHARD GASOLINE WAGON ENGAGED IN FRENCH MAIL SERVICE IN MADAGASCAR.

The Metric System.

The increasing use of the metric system of weights and measures in the automobile world makes the attitude of the countries of the world on this subject one of considerable interest to automobilists, especially as France and Germany, not to mention any other automobile-producing countries, use this system exclusively, and the growing prominence of the United States in the manufacture of automobiles serves to increase the confusion arising from two separate standards.

MAIL COLLECTION MOTOR TRICYCLE IN BUDA PESTH, HUNGARY.

The *British Trade Journal*, London, England, publishes some interesting data on the subject, following a reference to the weights, and measures bill, read for the third time in the House of Lords at its last session. Should this bill become law, the metric system will be compulsory in Great Britain, and, though its use in the colonies will be optional, the fact that the home country uses the metric system exclusively will make it necessary for the colonies to follow suit. Moreover, Canada and the other principal colonies have always followed British legislation with regard to weights and measures. Canada is the only one of the British dependencies that has acted upon the law of 1897, which made the metric system optional. The metric system is quite extensively used in Canada, especially in the French districts, and also, to some extent, in the railroad shops. At Ottawa, the capital of the Dominion, there is a fine collection of standards, and there are also provincial offices in many places supplied with standards and expert inspectors.

The measure which has passed the House of Lords proposes to allow three years before making a change compulsory with regard to ordinary weights, six years with regard to ordinary measurements, and ten years with regard to land measurements and surveying.

The metrical countries are: Argentina, Austria-Hungary, Belgium, Brazil, Bulgaria, Chile, Colombia, Kongo Free State, Costa Rica, Cuba, Porto Rico, Denmark and colonies, Ecuador, France and colonies, Germany and colonies, Greece, Guatemala, Haiti, Dominican Republic, Netherlands and colonies, Honduras, Italy, Japan, Mexico, Nicaragua, Norway, Peru, Portugal and colonies, Roumania, San Salvador, Servia, Spain and colonies, Sweden, Uruguay, Venezuela, and Egypt.

NEW ELECTRIC MAIL WAGONS EMPLOYED IN THE CITY OF PARIS, FRANCE

The 40-horsepower Apperson car belonging to Director Jerome A. Ellis, of the Chicago Automobile Club, was destroyed by fire in the barn at Riverside, Ill., Wednesday night, October 26. Mr. Ellis has already placed an order for a new 70-horsepower car of the same make.

Croker Makes Amateur Record at Yonkers.

Covers the Mile in S. & M. Simplex in 57 3-5 Seconds—Ford Racer Beats the Big Renault—Other Events.

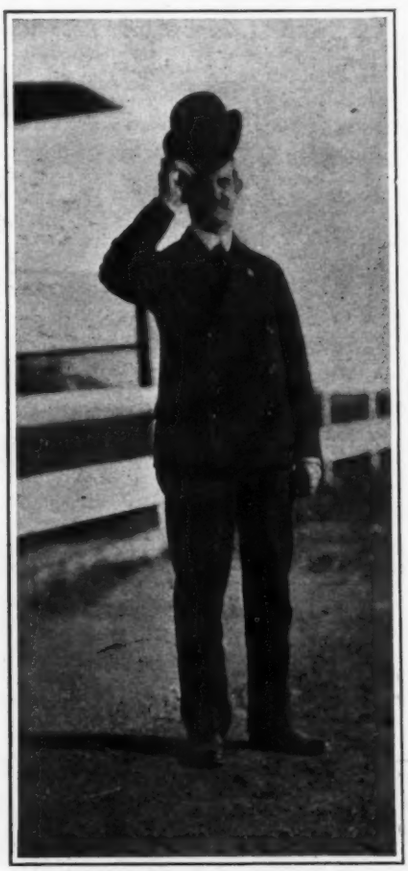
THE hottest finish of the season, at the end of five miles of real, downright racing between a heavy-weight 60-horsepower French road racer and a light-weight 20-horsepower American track skeleton, resulted in a win for the pigmy by a length, or, in the official figures, one-fifth of a second. Some three thousand persons who journeyed to the Empire track, Yonkers, N. Y., on November 8, election day, were well rewarded, notwithstanding the decorous gait which seemed to be the limit for the Kiser-Bullet combination, which was expected to furnish an exhibition of real speed.

Kulick's remarkable performance with the Ford occurred in the final of the international cup race. The Ford was pitted against the 25-horsepower Standard, driven by Philip Adams, in the heat for American cars, and won with ease in 3 minutes 3 4-5 seconds, the distance being three miles. For the French heat W. Gould Brokaw's two Renault cars, 30 and 60-horsepower, were entered; but as only the 60-horsepower car was on the track, and A. G. Vanderbilt's 90-horsepower F. I. A. T. was the only Italian representative, the French and Italian heats were necessarily omitted, and the Ford, the Renault and the F. I. A. T. contested the final.

Through a misunderstanding only the two foreign cars went to the scratch for the final, no one seeming to have remembered that the Ford was entitled to a place, and a start was made. Sartori piloted the big Italian machine, and made a splendid start, getting away in the lead and holding Bernin at his back once around the track. Coming down the home stretch the Frenchman gained on the Italian, and at the turn was making a desperate attempt to pass him, when the racers were flagged by the track officials. A man in the press stand had discovered that the Ford was not in it, and shouted: "Where's the Ford?" Then someone woke up and flagged the racers. Sartori, however, was so intent upon holding his hardly won premier position that he failed to notice the signal, and went thundering around under the impression that he was well in the lead, and only stopped when, on the next round, a track official waved a flag as close to him as he dared. On discovering that the start had been a false one Sartori was, to say the least, incensed at having lost what seemed an excellent chance of victory.

There was a good deal of good-natured chaffing indulged in when the three cars lined up for a fair start—the huge F. I. A. T. outside, the frilled Renault, almost as big, in the middle, and the insignificant-looking Ford at the pole. No one seemed to take it seriously, and a laugh went up when the three started toward the line for the flying start, the Ford looking as if it was trying to imitate the movements of its big competitors. The start was a good one, and Kulick instantly made a dash for the lead, which he secured by the time the first turn was reached. And then the crowd in the grand stand stood up, to a man, and roared with laughter at the "ridiculous" sight. Kulick's little machine took the turn beautifully, almost hidden by the two following monsters, and then shot away like a streak, gaining rapidly both on the turn and in the straight. Bernin had taken second place and Sartori trailed behind, carrying his usual luck, for he dropped out in the third mile with a burst tire. The race, narrowed down to Kulick and Bernin, was at once seen to be the real thing.

The Ford took the turns in time-saving fashion, and continued to increase its lead until the last mile. Bernin saw his last chance slipping through his hands, and started after the flying midget with such vim that he began to close the gap. The crowd saw it, and got on its feet and rooted for the little car. Bernin gained on the straight stretches, but the Ford skated around the turns like the wind. As they rounded the last turn Bernin was seen to run wide to get past his rival, who scurried along in the shadow of the fence. Bernin's car fairly flew over the ground, eating up the Ford's lead yard by yard, foot by foot, until the result hung in the balance; but the turns had been too nicely calculated by Kulick, and Bernin crossed the line with the red nose of his car just about to overlap Kulick's seat at the rear of the skeleton. The popular feeling in favor of the little fellow was evidenced by the roar that greeted the finish.



MANAGER REEVES SAYING FAREWELL TO THE RACING SEASON.

Kulick's time for the five miles was 4 minutes 48 2-5 seconds, and the difference in the times of the two cars was announced as one-fifth of a second. The winner made the first mile in 59 seconds, equalling the world's record made by the same car on the same track, on October 29, while the figures for the second and third miles are new records for light and middle-weight cars, supplanting the times made by Kulick on October 29 at the Empire track.

Earl Kiser made three attempts to run an exhibition 15 miles, but his *Bullet* failed him every time. The first trial ended in the fifth mile; the second did not get as far as an official start; and the third came to an end during the twelfth mile, after eleven miles had been done in 11 minutes 11 3-5 seconds. It seemed impossible to get the old racer into good humor, and it finally left the track with a bad knocking plainly audible from somewhere in its interior.

Frank Croker's exhibition with his Smith & Mabley Simplex was quite a surprise to many, though those who had had an oppportunity to see his work in the Vanderbilt Cup race anticipated good driving. His first mile, made with flying start, was clocked at 57 3-5 seconds, a new amateur track record; and the amateur record was broken in each succeeding mile up to the twelfth, when he was forced to give up owing to a damaged tire. The time for the 12 miles was 11 minutes, 32 1-5 seconds. Croker's driving was uniformly excellent, and his manner of taking the turns would have done credit to a professional.

A special match race at ten miles between the 60-horsepower Renault and the 90-horsepower F.I.A.T, arranged by the owners of the cars, W. Gould Brokaw and A. G. Vanderbilt respectively, was of no particular interest as a race, the French machine winning without much trouble, though the F.I.A.T. was closing the gap when the cars finished. Bernin's time for the ten miles was 9 minutes 54 seconds, Sartori finishing in 9 minutes 59 2-5 seconds.

The Diamond Cup race, five miles free for all for the Diamond Rubber Company's cup, was called off because there were not three starters on hand, the rules stipulating that there shall be not less than that number to make a race. The Ford racer was entered for this event, but broke a bearing in the last stretch of the International and was unable to compete.

The Mount Vernon cup race, in which the handicapping is arranged according to price—a dollar a yard—was won by a 6 1-2-horsepower Rainey car, driven by A. Comancho. Second place was taken by a 4 1-2-horsepower Oldsmobile, driven by L. C. Hutchison. The distance was one mile, and the winner's time was 1 minute 19 2-5 seconds.

The last event of the day was the five-mile Empire Handicap, in which the starters were a 6 1-2-horsepower Rainey, 40-horsepower Decauville, 25-horsepower Standard, 24-horsepower F.I.A.T. and the 60-horsepower Renault, the latter being on the scratch. Good handicapping resulted in a finish which, for such an event, was excellent. Guy Vaughan, in the Decauville, won by about 50 feet from the Renault, though it looked for a few seconds as though the latter would win. Bernin, however, had made an exceedingly poor start, and it is probable that the time thus lost cost him the race.

The Rainey car, which was erroneously designated in the official programme as having a 6 1-2-horsepower motor, is a machine built at the shops of the American Automobile Storage Company, 40 West Sixtieth street, New York, the motor, which A. Comancho rates at 12-horsepower, having been constructed from parts furnished by the manufacturers of the Aster motor. On account of its special construction this machine was protested by R. G. Howell, who drove the Oldsmobile, which was third in the same race, though Comancho stated that he entered the car in good faith and stood ready to sell it for $650, the price under which entry was made and the handicap allowed.

FRANK CROKER IN S. & M. SIMPLEX MAKING THE TURN OPPOSITE CLUBHOUSE.

The summaries follow:

Mount Vernon Cup race, one mile, handicap by price.—Starters, A. Comancho, 6 1-2-horsepower Rainey, 350 yards; L. C. Hutchison, 4 1-2-horsepower Oldsmobile, 350 yards; R. G. Howell, 7-horsepower Oldsmobile, 250 yards. No car on scratch. Won by the Rainey. Time, 1:19 2-5.

Fifteen miles exhibition by Earl Kiser driving the Winton *Bullet*.

One mile, :56 3-5; 2 miles, 1:54; 3 miles, 2:53; four miles, 3:54; five miles, 4:53; six miles, 5:53; seven miles, 6:52 4-5; eight miles, 7:55 2-5; nine miles, 9:01 4-5; ten miles, 10:07; eleven miles, 11:11 3-5.

Stopped with engine working badly.

Special ten-mile match race between W. Gould Brokaw's 60-horsepower Renault and A. G. Vanderbilt's 90-horsepower F.I.A.T. Won by the Renault, Bernin driving.

One mile, 1:02 2-5; two miles, 2:00 1-5; three miles, 2:58 2-5; four miles, 3:54 2-5; five miles, 4:56 2-5; six miles, 5:56; seven miles, 6:55 3-5; eight miles, 7:54 4-5; nine miles, 8:55; ten miles, 9:54.

Time for the F.I.A.T., Sartori driving, ten miles, 9:59 2-5.

First heat, International cup race, three miles.—Starters, 20-horsepower Ford, driven by Kulick, and 25-horsepower Standard, driven by Adams. Won by Ford. Winner's time, first mile, 1:03; second mile, 2:02 2-5; third mile, 3:03 4-5. Adams's time, for three miles, 3:26 4-5.

Final of International Cup race. Distance, five miles. Starters, 20-horsepower Ford, driven by Frank Kulick; 60-horsepower Renault, driven by Bernin; 90-horsepower F.I.A.T., driven by Sartori. Won by the Ford, Renault second. Winner's time, first mile, 0:50; second mile, 1:54; third mile, 2:51; fourth mile, 3:49; fifth mile, 4:48 2-5. Bernin's time for five miles, 4:48 3-5. Sartori dropped out in third mile with flat tire.

Empire Handicap, five miles. Starters, 6 1-2-horsepower Rainey, driven by A. Comancho; 40-horsepower Decauville, driven by Guy Vaughan; 25-horsepower Standard, driven by Phil Adams; 24-horsepower F.I.A.T., driven by E. Cedrino; 60-horsepower Renault, driven by Bernin. Won by the Decauville. Time, 6:40 2-5.

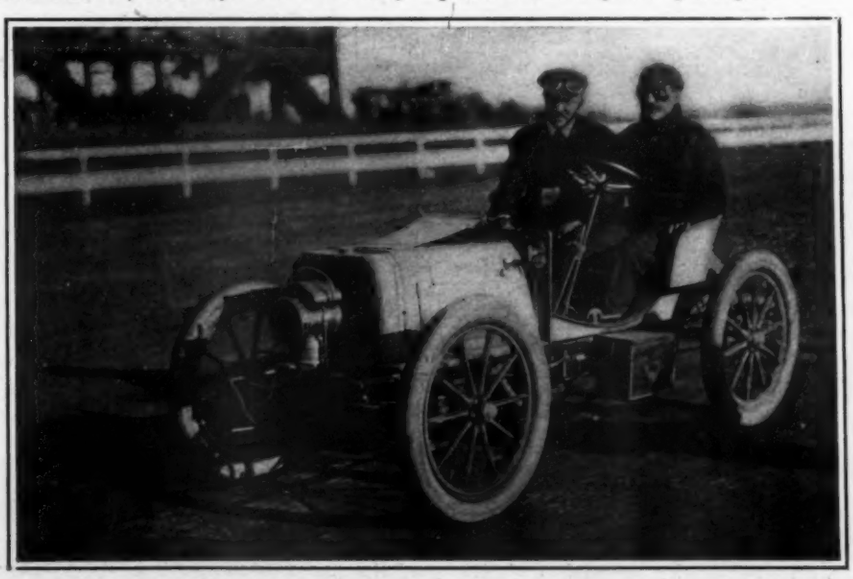
Exhibition by Frank Croker in Smith & Mabley Simplex, 75-horsepower.

First mile, 0:57 3-5; second mile, 1:55; third mile, 2:52 3-5; fourth mile, 3:50 2-5; fifth mile, 4:48; sixth mile, 5:54 4-5; seventh mile, 6:45 2-5; eighth mile, 7:43; ninth mile, 8:41; tenth mile, 9:38 2-5; eleventh mile, 10:35; twelfth mile, 11:32 1-5.

Croker was driving for records to 20 miles, but was stopped by a tire giving out.

Blackpool, England, is about to have another racing meeting on either November 12 or 19, the date depending entirely upon the readiness of the cars. Record breaking only is to be indulged in. Besides the expected entries by Continental cracks, Mr. Edge's new six-cylinder 100-horsepower Napier, Mr. Earp's 85-horsepower Napier, Mr. Rolls's 100-horsepower Mors, Mr. Fletcher's 90-horsepower Mercedes, the 96-horsepower Wolseleys and several high-powered Darracqs will participate.

EARL KISER IN THE WINTON BULLET GOING FOR FIFTEEN-MILE RECORD AT EMPIRE CITY TRACK, NOVEMBER 8.



PREMIER APPEARANCE OF 12-H.P. RAINEY CAR WITH COMANCHO AT THE WHEEL.

Suggestions to the Inexperienced.—X.*

Essential Parts of the Chassis Described and Their Principles Made Plain for the Benefit of the Novice.

By A. D. RIVER.

The Chassis.

THE term chassis denotes the running gear of the vehicle, with the frame, the propelling and transmitting mechanism, and the tanks; in short, the entire vehicle with the exception of the carriage work. The motor, the speed-changing gear, and the clutch have been discussed, and it remains to consider the running gear, the steering gear, and the method of transmission to the wheels.

Experience has shown that, in all but the lightest vehicles, the motor and speed-changing mechanism, as well as the body, must be supported on springs. Except for some cases, when a single cylinder motor is used, the most suitable, as well as the simplest, arrangement is to mount both body and machinery on a single frame, so that the weight of the former is available for absorbing the vibration of the motor. One set of springs then carries the whole load.

This necessitates a flexible connection between the power plant and the rear wheels or axle, and the various transmission systems may be classed according to the nature of this flexible connection. This, in turn, is closely related to the location of the motor in the car.

The simplest transmission system is found when the motor is laid horizontally in or under the body, with either a planetary speed-changing gear or a compact individual clutch or sliding gear train beside it, and a sprocket chain connecting the latter directly with the rear axle. With the planetary gear device, this represents the standard arrangement for runabouts of domestic origin. It has the merits of extreme simplicity and comparatively high efficiency, as well as of cheapness. These qualities have led to its adoption in several tour-

* Continued from page 474, issue of Oct. 22, 1904.

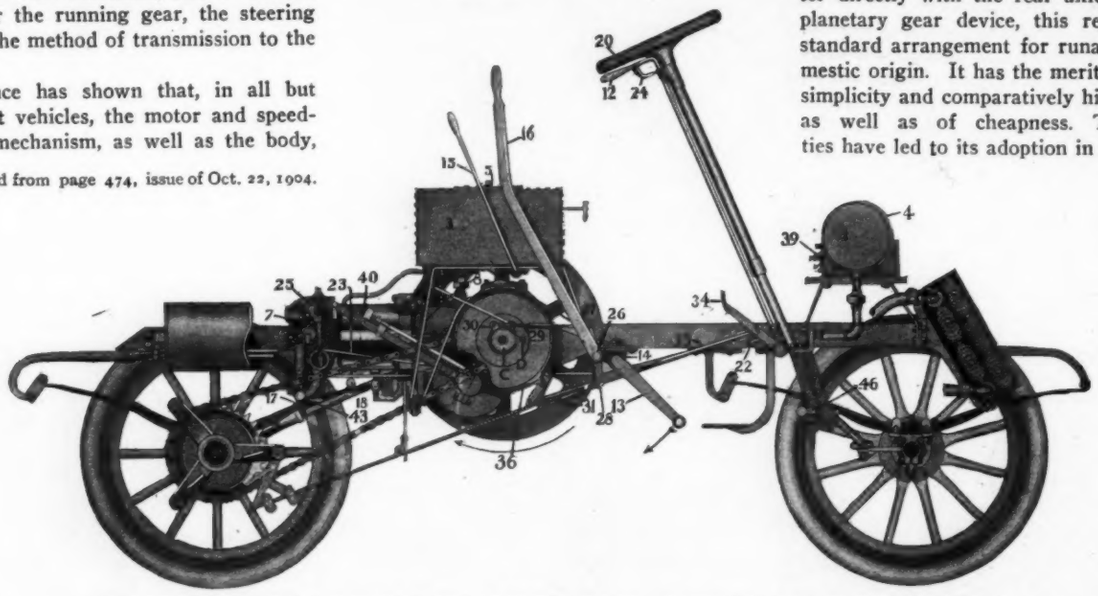


FIG. 1.—SIDE VIEW OF CHASSIS OF CADILLAC RUNABOUT. See Description of Reference Numbers Below.

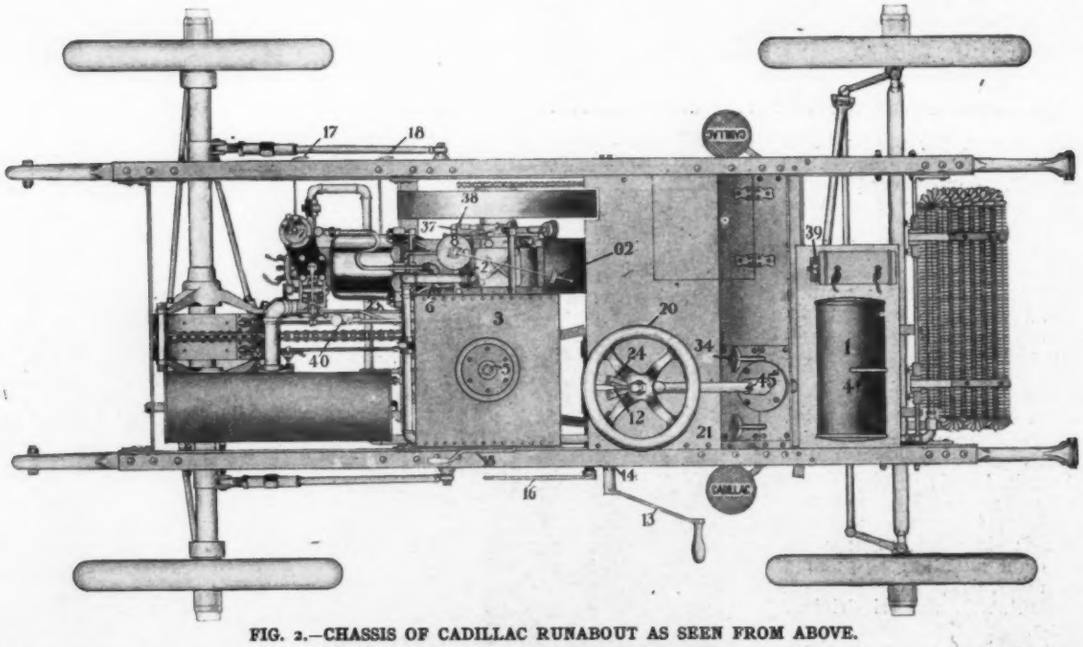
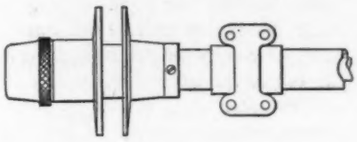


FIG. 2.—CHASSIS OF CADILLAC RUNABOUT AS SEEN FROM ABOVE.

1, Water tank. 2, Standpipe for filling 1. 3, Gasoline tank. 4, Air vent. 5, Filling plug. 6, Main gasoline valve. 7, Carbureter. 8, Cylinder oil cup. 12, Throttle lever. 13, Starting crank. 14, Starting shaft. 15, Spark timing lever. 16, Speed changing lever. 17, Connection to primer. 20, Steering wheel. 21, Footboards. 23, Connection to throttle. 25, Mechanism varying the inlet valve lift. 27, 29, 30, Operating mechanism of high-speed clutch. 34, Slow-speed pedal. 36, Slow-speed friction band. 39, Vibrator on coil. 40, Grease cup.

ing cars, as well as in runabouts. What is commonly called the "American type" of design is represented by the horizontal



motor, planetary or individual clutch system, and single-chain direct drive.

A good example of this class of vehicle is depicted, minus the body, in Figs. 1 and 2, which show the Cadillac runabout in side elevation and plan. This machine has an 8-horsepower motor of one cylinder and a planetary gear mounted on an extension of the engine shaft.

A larger car—the Knox—with two-cylinder, air-cooled motor and planetary speed-changing gear, is shown in Fig. 3. It has long arched side springs of the well-known type extending from axle to axle, and supporting the body, frame and mechanism.

A common form of axle for machines of these types is shown in principle in Fig. 4. Here *A, B* and *C* are three gears of a differential, and *D* is the hub of a "spider"

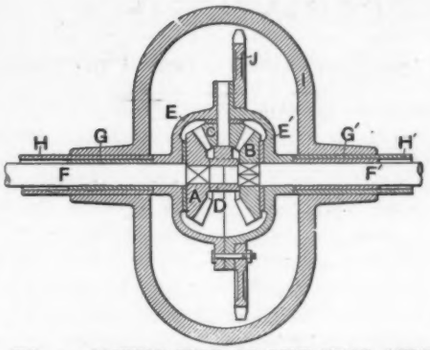
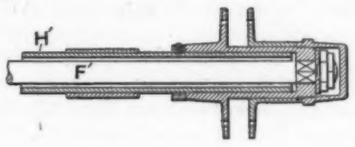


FIG. 4.—COMMON TYPE OF LIVE REAR AXLE AND CHAIN DRIVEN DIFFERENTIAL GEAR.

on whose arms two, three, or four pinions *C* may be carried. Shafts *F F'* have their inner ends squared to receive gears *A B*. *G G'* are bushings in which the shafts turn, and *H H'* are sleeves brazed into the ends of frame or case *I*. The sprocket *J* is bolted to the case *E* of the differential, in which the arms of the spider are secured. The spring seats are brazed on the sleeves *H H'*, near their outer ends. Usually, in axles of this type, the sleeves terminate close to the wheel hubs, and bushings are fitted just inside to support the shafts, whose outer ends are keyed into the hubs of the road wheels.

In the construction shown, however, the sleeves extend into the wheel hubs, which



turn on them, and the shafts have squared ends, which enter sockets in the hubs. Thus the sole function of the shafts is to rotate the hubs, and they are subjected to no bending stresses whatever. On this account they can be made much lighter than when the ordinary construction is followed.

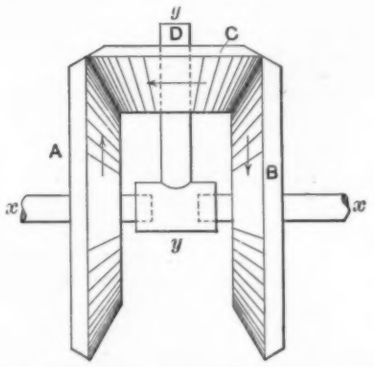


FIG. 5.—DIAGRAMMATIC ILLUSTRATION OF PRINCIPLE OF BEVEL GEAR DIFFERENTIAL.

The differential or compensating gear, already referred to, is a very necessary part of an automobile, its function being to permit the outer rear wheel on a curve to turn faster than the inner, while, at the same time, the driving effort is applied equally to both. Its principle may be seen from Figs. 5 and 6, representing diagrammatically the bevel and spur gear types respectively.

In Fig. 5, *x x* represent the two shafts of the axle, to which are fixed the bevel gears *A B*. These mesh with a pinion *C* carried by a pin *D*. Suppose now that *D* revolves about the axis *x x* in the plane *y y*, it will carry *C* with it, and *C* will carry *A B*. If both *A* and *B* are equally free to turn, both will turn at the same rate of speed as *D*, and *C* will not rotate around its centre *D*. But if one, as *A*, be held still, *C* will rotate and compel *B* to turn at double its former speed. If *A* is free to turn, but more slowly than *D*, *B* will turn faster by the same amount; and in all cases the sum of the angular velocities of *A* and *B* will be double the angular velocity of *D*. At the same time, if we neglect friction, the driving force applied to *C* will be uniformly divided between *A* and *B*.

In the spur gear differential, Fig. 6, the place of the bevel pinion *C* is taken by two wide-faced spur pinions *D*, one of which meshes with each of the gears *A B*, while both mesh together. The arrows show how motion of either *A* or *B* in one direction is reversed in the other.

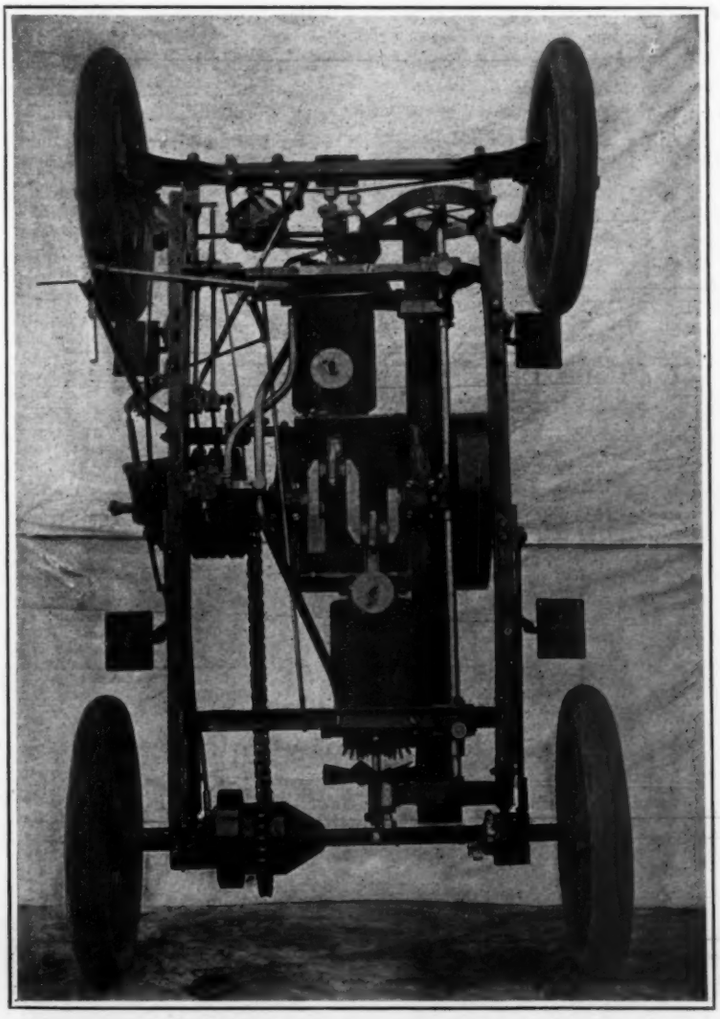


FIG. 3.—CHASSIS OF KNOX CAR WITH PLANETARY CHANGE-SPEED GEARING.

A live axle with the differential in the centre must be stiffened very carefully. It is manifest that the pull of the chain, especially when the low gear is used, exerts a strong tendency to bend the axle in the middle, and when the engine is at all powerful, or when it has a heavy flywheel, the force thus applied may be two or three thousand pounds when the clutch is suddenly applied. For this reason it is hardly possible to make the axle too strong. In some cars the bending effect, due to the chain tension, is avoided by putting the sprocket

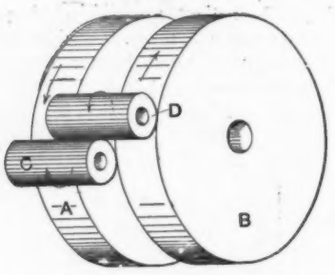


FIG. 6.—DIAGRAMMATIC ILLUSTRATION OF SPUR DIFFERENTIAL GEARING.

wheel close to one of the axle-bearings, but this, of course, produces unequal wear of the bearings, and, in addition, it is not always convenient to locate the sprocket pinion at one side of the car.

(To be Continued.)

Motoring in India.

Automobiling in India is rapidly increasing in popular favor, and no wonder, for the roads, particularly in western India, are in many cases little short of perfection. The weather between October and March can be depended upon to be fine, sudden and unexpected changes being very rare during this period. With such a combination—good weather and the best of roads—it would be remarkable if the highways remained free from the track of the pneumatic tire for any length of time. There is already an organization called the Motor Union of Western India, which held an endurance run recently. A number of the native noblemen have taken to the automobile, as well as the British civil and military officials, who find it a great advantage in traveling, especially where there are no railroads or inadequate railroad service. The accompanying photograph depicts a typical Indian scene, with a contrasting touch of modernism, the native cart and the automobile facing each other, surrounded by Hindoos, who, if not beautiful, are certainly what an artist would call decorative. The occupants of the car are Lord Curzon, Viceroy of India, and Lady Curzon, who was Miss Leiter, of Chicago. Lady Curzon has been seriously ill and at the point of death in England, but is now recovering. The photograph was taken in Simla in the Himalaya mountains, the summer capital of British India.

Glidden's Deed of Gift.

The terms of the deed of gift under which the Charles J. Glidden Touring Trophy is given to the American Automobile Association for international competition were accepted by the board of directors of that organization at a meeting held at the rooms of the Automobile Club of America, New York City, on November 2, and the document was officially signed. The provisions are very general, touching only upon the outlines of the proposed competitions. The details will be worked out by a committee which has not yet convened. The terms of the deed of gift are substantially as follows:

The value of the trophy is to be not less than $2,000.

The trophy is to be held forever in trust by the American Automobile Association and its successors.

The cup is to be called the Charles J. Glidden Touring Trophy.

Competitions are to be held annually, beginning in 1905. Competitors may be members of any automobile club affiliated with or recognized by the American Automobile Association.

Competitors must have been members of such club for at least one year previous to entering for the competition.

The cup is to be held by the club to which the winner belongs until it is won by a member of another club, the holding club to give bond for the safe keeping of the trophy to the American Automobile Association.

Competitions for the trophy shall be run over regularly used highways, and shall cover a distance of not less than 1,000 miles, at the rate of not less than 500 miles a week.

Contests must be held in the country of the club holding the trophy, except, however, in the years 1905, 1906 and 1907, when the contests must be held in the United States, Canada, or both.

The entry fee shall be not less than $100, fifty per cent to be refunded to starters and the entire fee to be forfeited by non-starting entrants.

Competing cars must be driven either by their owners or by drivers approved by the committee in charge of the competition. In the case of the car being handled by a driver, however, the owner must be a passenger.

More detailed regulations governing the competitions are to be fixed by a committee of seven, consisting of the president of the American Automobile Association, who shall be chairman; the president of the Automobile Club of America; the presidents of the automobile clubs of Great Britain and Ireland, of France and of Germany, and the president of a Canadian automobile club recognized by the A. A. A., or representatives named by the committee. The chairman and two members will constitute a quorum.

Attached to the document are the signatures of Charles J. Glidden, Harlan W. Whipple, Samuel H. Valentine, George E. Farrington, A. R. Pardington, Windsor T. White, Elliot C. Lee, W. C. Temple, Augustus Post and James L. Breese.

The Pope Motor Car Company's exhibit at the Paris automobile show will be under the eye of Harold A. Pope and Henry A. Leinhard, manager of the Pope Company's foreign department, who leave for Paris on November 22. The exhibition opens early in December, and H. H. Lyttle, whose departure for Paris has been reported in these columns, is already on the ground.

LORD AND LADY CURZON AT SIMLA, SUMMER CAPITAL OF BRITISH INDIA.

Maxwell Gasoline Cars.

Announcement was made in these columns some time ago that the Maxwell-Briscoe Motor Company had acquired the factory and equipment at Tarrytown, N. Y., formerly owned by the Mobile Company of America, and that preparations would be made for the manufacture of gasoline automobiles. Since then active work has been in progress in adapting the plant, which was designed for building steam automobiles, to the manufacture of gasoline machines. The factory is a large one, and the equipment of both standard and special machine tools is complete. It is the intention of the concern to produce cars in large numbers, and to this end jigs and templates are being made for all parts which can be handled to advantage by this means. All but a very few of these are finished and in use, and the first cars are already in the hands of purchasers. It is anticipated that by December 1 two cars a day will be turned out, and the output will be increased later.

The Maxwell automobiles are now being built in two styles; a touring car with side entrance tonneau, and a two-passenger runabout, both light machines, embodying the same main features. Both have pressed steel frames, double opposed cylinder motors, thermo-siphon water circulation and shaft and bevel gear drive. The mechanism of the smaller car is, in fact, almost identical with that of the larger except the transmission, which is of the sliding gear type in the touring car and planetary in the runabout. A description of the touring car will answer for both.

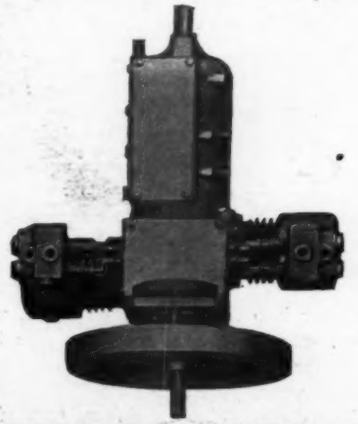
Pressed steel side frames, of the usual channel section and tapered at the ends, are connected and braced by substantial cross members of the same material. The four main corner plates are forged integral with the spring hangers. The step for the side entrance, the end of a cross frame member, and the front end of the rear spring come together at the same part of the frame, so the step, corner brace for the cross frame and the spring hanger are made all in one piece, a steel casting. In fact, wherever it is practical to combine two or more parts in one this is done, steel castings, which are freely used, greatly facilitating this practice.

Semi-elliptic springs are used front and rear and are 36 and 46 inches long respectively, their great length and flexibility making the car comfortable to ride in. Riding in the tonneau is considerably more pleasant than is the case in the average light tonneau car. Steel tubing, 2 inches in diameter and 1-4 inch thickness of wall, is used for the front axle, which is straight, with the knuckle stubs pinned and brazed into the ends. The live rear axle is 1 1-4 inches in diameter, of ground steel, running in four sets of Hyatt roller bearings, connecting in the middle with a Brown-Lipe spur differential. Special Brown & Sharp gears, hardened and ground, are used for the bevel gear drive.

The problem of taking the thrust due to the use of bevel gears has been solved in a manner which Mr. Maxwell has found to give satisfaction and to eliminate end thrust on the rear axle from this cause. A hardened steel roller, of the same size and contour as the pinion, is journaled in the gear case on the rear axle, so that it bears against the back of the large bevel gear opposite the pinion. Sliding friction between the roller and the back of the gear is eliminated by beveling the roller like a gear. Mr. Maxwell states that though this method has been tried before, it has not given satisfaction because the rollers used were too small, and were not formed so as to produce a pure rolling contact without friction. After six months' service in a test car one of Mr. Maxwell's rollers was not perceptibly worn, and the same statement was applied to the condition of the bevel gear and pinion.

Two steel truss rods give additional stiffness to the rear axle, the usual distance rod between the differential case and the frame being omitted, however. Originally this rod was used; but it was accidentally broken, and as the car was found to run more smoothly without it and no ill results followed, it was discarded permanently. Power is transmitted from the transmission shaft to the rear axle by a steel shaft, 1 inch in diameter, with universal joints at each end. The wheels are 30 inches in diameter and are shod with 3 1-2-inch tires.

Under the hood the double opposed cylinder motor is placed with the heads of the cylinders against the side frames, to which they are bolted, and its shaft running lengthwise of the car. Transmission gear shaft, propeller shaft and pinion shaft are all in line with the motor shaft, when the



MAXWELL ENGINE, WITH CRANK-CASE AND CHANGE-SPEED GEAR CASE CAST IN ONE PIECE.

car is loaded to its normal capacity, so that the universal joints have only to take care of the comparatively slight deviations from a straight line caused by the up and down motion of the motor and rear axle with relation to each other when the car is in motion. The double opposed cylinder motor lends itself readily to this position, as its lubrication is not affected by the angle of the shaft.

The cylinders have a bore and stroke each of 5 inches. Compression is approximately 75 pounds to the square inch, and the motor is rated at 16-horsepower at 1,000 revolutions a minute, though a maximum speed of 1,500 revolutions a minute may be attained. Three piston rings are placed in separate grooves, all being at the head of the piston, which is the same length as the stroke. Heads and water jackets are cast

DISPOSITION OF ENGINE IN CHASSIS.

integral with the cylinders, the jackets covering only the combustion chambers. Cooling flanges are cast on the barrels of the cylinders, and these assist in stiffening the casting while being machined.

Cast steel is used for the connecting rods, which are of a deep U section with the open side up. Both bearings are adjustable, the crank pin bearing being of the well-known hinged type and the piston pin bearing being split on one side and provided with a bolt to take up wear. Both bearings are of babbit-lined bronze, the anti-friction metal being rolled after being run in. The bearings throughout the machine are made in this manner.

Both inlet and exhaust valves are mechanically operated and are placed on the upper side of the motor, the brass caps closing the openings through which the valves may be removed being well above the side frames of the car. The valve operating gear is all contained in a rectangular cast iron frame which is attached to the top of the crank case. The cam shaft runs through this frame and is journaled in bearings cast integral with the frame, while the push rods of hardened steel work through long guides, also cast with the frame. On a boss, which is an extension of the cam shaft bearing on the forward side of the frame, the distributer is mounted. This does not revolve, simply oscillating to advance or retard the time of ignition, while the shaft carries the revolving member.

Crank case and transmission gear case are made in one aluminum casting, thus keeping the parts in perfect alignment. This case also contains the clutch in a compartment of its own. The clutch is of small diameter and is of the metal to metal

friction type, running in oil. Wear is taken up automatically by a follower and spring. In action this clutch works well, taking hold without perceptible jar, slipping smoothly if not thrown in fully, and transmitting the power without noticeable slipping when fully engaged. This last feature has been well tested in climbing stiff grades. The rear end of the gear case is supported by a cast steel drop frame extending across the main frame. This, with the two points of support already mentioned, affords a three-point support for the motor, the cylinder heads being attached to the main frames. The spoked fly-wheel is at the front of the motor and weighs 110 pounds.

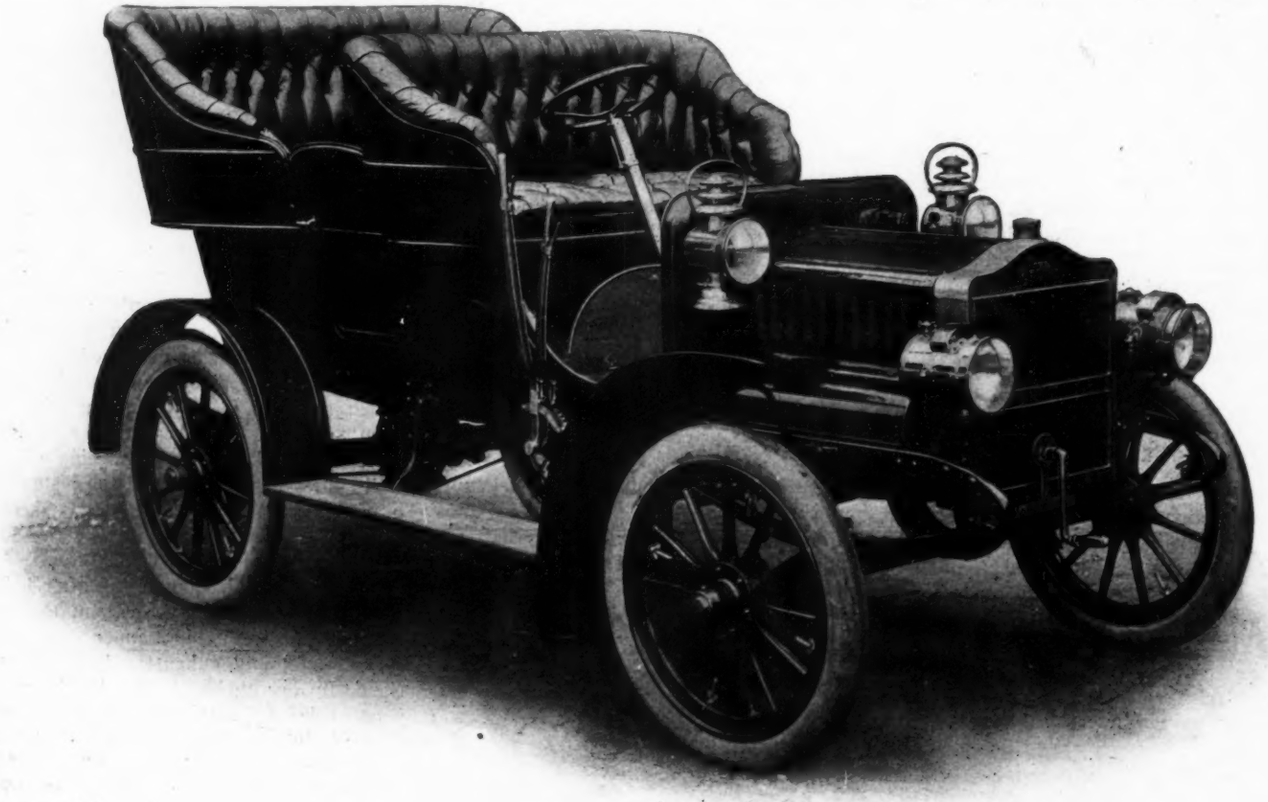
Control of the car is effected by means of a side lever for shifting the change speed gears; a side lever operating the emergency brakes; an ignition timer on the steering wheel column; a foot operated throttle; a clutch pedal, and a foot brake acting on a drum or the transmission shaft just outside the gear case. The speed changing lever interlocks with the clutch pedal, so that the gears cannot be shifted until the clutch is thrown out; neither can the brakes be applied while the clutch is in. Bronze drums on the rear hubs are encircled by steel friction bands, comprising the emergency brakes, connection being made with the lever by steel rods. Throttling is done on the air inlet, the gasoline supply taking care of itself once the proper adjustment has been made in attaching the carbureter, which is of the float feed type.

Circulation of the cooling water is accomplished by the thermo-siphon method. The manner of working out the details of this system is ingenious, and, the designer states, has proved efficient. The cellular radiator, placed in the usual position, has no tank at the top, but instead has a small tank at the bottom and another of the same size a third of the way up the radiator. These tanks extend entirely across the radiator and take the place of so many rows of cells, the adjoining cells opening directly into the open water spaces provided by the little tanks. Each cylinder has its individual water connections, consisting of heavy rubber hose. The hot water connection leads from the top of the cylinder into the upper water space, while the lower or cold water return pipe leads from the lower water space into the bottom of the water jacket.

The theory is that the front part of the radiator, getting the full cooling effect of the air, is cooler than the back, which has not the same direct exposure. Therefore the hot water should rise in the back and fall down the front of the radiator. Whether this theory works out in practice the way it is figured by the designer it is impossible to say; but the water showed no indication of overheating during a run part of which was over rather long and stiff hills. The double water space, while not essential to the working of the system, was found to increase its efficiency. Originally there was but one, at the bottom.

Forced lubrication is used, the pumping action occurring in the crank case being utilized for this purpose. As the pistons move toward each other the air between them is compressed, and the pressure thus exerted is piped to the surface of the oil in the reservoir, forcing it through the feed tubes; while the vacuum created by the opposite stroke is made to draw the oil into the motor. There is an oil feed for each cylinder and one for the transmission, the lubrication of other parts of the mechanism being effected by compression grease cups and oil cups. Each cylinder oil pipe is tapped in so that it discharges into the trough of the U-shaped connecting rod when the piston is near the head of the cylinder. When the piston covers the opening oil is taken up by it; and a hole drilled in the piston exactly over the split in the piston-pin bearing allows oil to drip into the latter when the two holes come together at the end of the stroke. A hole carries oil from the hollow connecting rod to the surface of the crank pin, and a similar hole at the opposite end of the rod leads to the piston pin bearing as an additional precaution. The third oil lead serves the transmission, dripping on the clutch which distributes it throughout the case.

The gasoline tank, which has a capacity of 12 gallons, sufficient for about 160 miles on ordinary roads, is of heavy galvanized iron and contains baffle plates to prevent



MAXWELL SIDE ENTRANCE TOURING CAR WITH DOUBLE OPPOSED MOTOR AND SLIDING CHANGE-SPEED GEAR.

the gasoline from surging about too much. It is located under the front seat, as are also the dry batteries.

The body of the car is a side entrance tonneau and is made of sheet steel, with mouldings and other ornamental devices pressed into the metal instead of being secured to it afterward. There is plenty of room in the tonneau, this greatly adding to the comfort of passengers, and under the tonneau seat is a storage space reached through a hinged door. Running boards and a step on each side afforded easy entrance, and the former are brought up to the wide fenders at each end. A hollow dash, also of sheet steel, contains the coil box switch and sight-feeds for the lubrication system.

A bevel pinion and toothed sector are used for the steering gear, the teeth being so formed that wear can be taken up by bringing them into closer mesh. For this purpose an adustment of the sector is provided, with a set nut to retain it in position. No part of the steering gear is attached to the foot boards, all being rigidly secured to the frames. The brass bushing in the floor through which the column passes acts simply as a guide, and is not depended upon to take any strain.

The runabout differs from the touring car mainly in that it is smaller throughout, has a runabout body and a two-speed planetary gear. The engine has cylinders of 4 inches bore and stroke and is rated at 8-horsepower. Similar methods of cooling, lubricating, control spring suspension, framing and drive are used. The wood wheels are 28 inches in diameter, with 3-inch tires. The runabout weighs slightly more than 700 pounds.

Absence of vibration and silence of running are noteworthy in both machines, as is also the lack of jar when the clutch is thrown in. The light weight of the smaller car makes it the equal of the larger one under similar conditions, and the designer states that he has searched Westchester county in vain for a hill that either car could not surmount with full load.

New Winton Models.

The Winton Motor Carriage Co. has issued a preliminary announcement outlining the features of its 1905 product, from which it appears that, while its first four-cylinder touring car, the Winton "Quad" described in these pages, last July 16, has been followed in respect to the transmission and control mechanism, some quite marked changes have been made in the motor and running gear. The specifications cover four models, viz., models A, B, and C, of 40, 24 and 16 horsepower respectively, and a "special" Model A, particulars of which are at present withheld. The following description is general, and covers the three regular models, which are similar in style.

The frame is of pressed steel of channel section, and has no false frame. The motor and change gear box are carried on malleable brackets attached to the main frame, and beneath the motor is a fixed dust pan preventing mud and dust from getting up from below. The motor is now vertical, and has four cylinders, cast in pairs, with integral heads and exhaust valve chambers. The inlet valves, as before, are suction-opened, and the lift is governed by air pressure on the familiar Winton pneumatic system. As all work on the motor is done from above, it is never necessary to get beneath it.

A special feature not yet fully explained is the design of the aluminum crank case, which is split vertically, and to which internal access is had by detaching one side, leaving the cylinders bolted to the other portion, with all the piping and accessories intact.

The carbureter takes fuel by gravity from an auxiliary tank just above it, this auxiliary tank being fed by pressure from the main tank. In place of the former batteries and multiple vibrator spark coils, a new form of magneto, positively driven by gears, and a single non-vibrator coil, with distributor, are used. The spark advance lever is on top of the steering wheel.

The speed-changing mechanism, so far as described, appears to be similar to that of the "Quad" in having individual clutches, each with one cone and one disc acting on a bronze member between them, and in giving direct drive on the high speed. Between this and the motor is a flexible coupling. Being directly under the footboard, the gear case is readily accessible for adjustment or inspection. From this the transmission is by jointed propeller shaft to the live rear axle, which is equipped with roller bearings and spur gear differential, and is steadied by a single ball joint strut. The service brake, on the drive shaft, is applied by a forward movement of the high gear lever. On the wheel hubs are emergency brakes applied by a pedal.

A distinctly new feature is the spring design, by which the number of active leaves in the spring is determined by the load carried. A double spring of six leaves is so shackled that only three leaves are engaged when one or two passengers are carried, whereas six leaves are engaged as the load increases. The makers claim exclusive right in this feature.

Circulation is maintained by a gear-driven centrifugal pump, and the fan back of the radiator is likewise gear-driven. In addition the flywheel spokes act as fan blades from their shape. The bonnet is air-tight to ensure maximum suction.

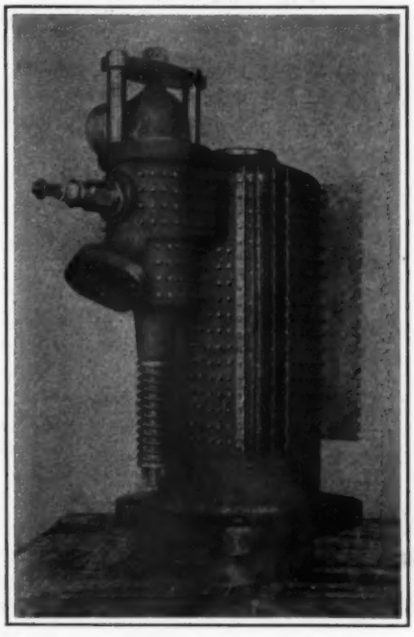
Lubrication is by a pressure-less roller feed lubricator feeding oil to the motor and rear axle in proportion to the motor speed.

The bodies have side entrances and seat five. The panels are cast aluminum, and the upholstery is leather, with 4-inch cushion springs and numerous pockets.

The cylinder sizes are as follows: Model A, 5 1-4-inch bore by 6-inch stroke; Model B, 4 3-8 by 5 inches; Model C, 3 1-2 by 5 inches; Model A has 9-ft. wheel base and 34 by 4 1-2 inch tires; Model B, 104-inch wheel base and 32 by 4 inch tires; Model C, 90-inch wheel base and 30 by 3 1-2 inch tires.

Air Cooling Fins.

A new system of air cooling for the cylinders of gasoline motors, the invention of A. E. England, Amesbury, Mass., is illustrated herewith. The cylinder casting is drilled and tapped for copper studs, which are screwed in and left projecting about 3-16 of an inch. Strips of sheet copper are punched close to one edge, with holes corresponding with the projecting copper studs on the cylinder, and then bent



METHOD OF ATTACHING AIR-COOLING FINS.

lengthwise at right angles, the angle being close to the row of holes. The strip is then placed vertically on the cylinder, the studs, which just come through the holes, being riveted over to secure the strip in place and make a good contact for conducting heat from the cylinder walls. Corrugations are formed on the outer edges of the copper strips or flanges. The process will be readily understood by an examination of the photograph, which shows the copper studs in place and some of the flanges riveted on. The cylinder shown is one of four used on a 65-horsepower motor built by Mr. England.

The Chicago School of Motoring will be opened November 15, at 246 State street, Chicago, with the object of developing competent chauffeurs, and to give owners a sufficient knowledge of the theory and practice of automobiles to enable them to meet emergencies that arise in the management of their cars. The school will be in charge of F. E. Edwards, educational director.

Correspondence

A Trip to the Yosemite Valley.

Editor THE AUTOMOBILE.

[107].—Thought it might interest many of your western readers to know how we made a trip from San Francisco to the Yosemite Valley in a Saint Louis car during the summer.

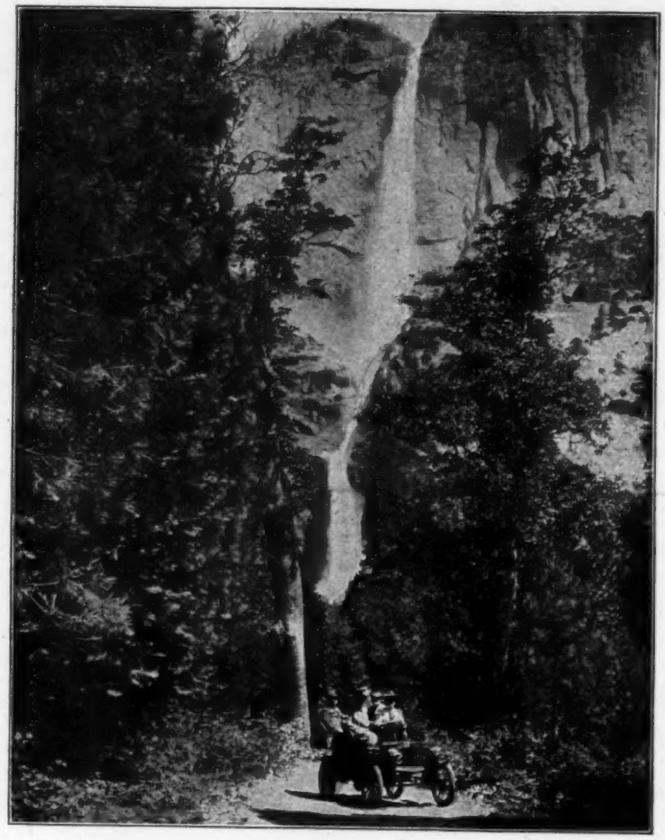
We left San Francisco on Friday, on the 9 o'clock boat for Oakland. The road between Oakland and Haywards is perfect, being the best road in the state. Soon after we left Haywards Mr. Sutton's machine was laid up with a blow-out. He had an old tire re-vulcanized, and the job was evidently a poor one. This blow-out delayed us for some time, and it was very nearly 3 o'clock when we finally left Haywards for Livermore. The roads between Haywards and Livermore are good, fair and poor, and we arrived there without further mishap before 5 o'clock, having made several stops.

After dinner at the Washington Hotel, we started for Byron, and made the distance of twenty miles, through very hilly country, but with good roads, in a little over an hour. We stopped at Byron all the next day, and towards 5 o'clock started for Stockton.

When we arrived at the San Joaquin bridge we discovered that the approach on the Stockton side had been washed away by the high water, and we were forced to return to Tracy, where we spent the night. Next day (Sunday) we loaded the automobiles upon a flat car and shipped them to Stockton, all the available roads from Tracy being under water. The distance between Tracy and Stockton is about twenty miles, and at 2 o'clock Sunday afternoon we unloaded the automobiles and ran them into the garage, intending to make a start Tuesday morning. Monday we spent in looking around Stockton and seeing that the cars were in fine trim for the hard part of the trip.

We ran from Stockton to Knight's Ferry, keeping up a twenty-mile clip all the time over very nearly perfect roads. After luncheon we left the Ferry, where, by the way, General Grant was married, for Chinese Camp. The road between Knight's Ferry and Chinese Camp has the reputation of being the worst stretch of road in California. For a distance of twenty miles we ran over loose rock and sand, passing through the section made famous by Bret Harte. Just as we pulled into Chinese Camp a big jerk line team of twenty horses came down the main street. So far we had had no trouble with horses, but fearing the jerk line team might be frightened, we turned into a side street. We soon found, however, that the drivers in the country were experienced men, and that we had nothing to fear from frightened animals.

Chinese Camp is a very small town at the present time, but in the early days was the center of a thriving mining district. At one time there were between three and four thousand Chinamen there working over the tailings left by the forty-niners. At present it is the railway terminus of a number of very important mines.



BENEATH THE GREAT YOSEMITE FALLS IN CALIFORNIA.

Next morning we left Chinese Camp before 7 o'clock, and our only experience with a fractious horse occurred shortly after. Going down Eagle Shawmut Grade we passed an Italian driving a white mule, and instead of taking the inside of the road he did the opposite, and on account of his curiosity paid more attention to us than to his mule. The result was that his light wagon turned over and we spent ten or fifteen minutes in righting it and getting him straightened round. From the foot of the grade we passed along a level road following the north bank of the Tuolumne River, through Jacksonville to the Tuolumne Bridge; thence up Moccasin Creek road to Cavagneros, where Priests' Hill, the bane of all automobilists, is situated. This hill is three miles long and has a grade of not less in any part than 15 per cent.; the maximum is about 22 per cent. We were told when we got into the Valley that more machines had turned back at this point than at any other. The roadway is narrow and covered with loose sand and rock, making it difficult for the wheels to get traction. Nevertheless, we found that with patience we were able to run up with very low speed. At one point we were forced to bind the driving wheels with rope which we carried for that purpose, and finally arrived at the summit, tired, but feeling we had accomplished something extraordinary.

From Priests, after luncheon, we ran to Big Oak Flat, an old mining camp; then to Groveland, where telegraphic communication ends. Just outside Groveland lies big Carrotte Hill, and after filling our machines with water at the summit, we ran down grade the next five miles to Big Creek Ford. It was a very steep hill on the Yosemite side of this ford, and when near the top our driving shaft broke. The continual strain of pulling up these steep grades had evidently crystallized the shaft, and we were forced to enlist the services of a teamster to pull us into Smith's Ranch, a distance of three miles.

A friend of ours in the cattle business happened to be passing towards Groveland while we were making our arrangements to be pulled into Smith's, and very kindly took a telegram, asking that a new shaft be forwarded as soon as possible. Finding that no accommodation was to be had at Smith's, we took a team and drove three miles to Hamiltons, where we were to stop for the next five days waiting for the shaft to be forwarded from San Francisco. I rode in on horseback to Groveland, got the shaft the night it arrived, and with the

country blacksmith drove out to Hamiltons, getting there at midnight. Next morning we started to work in earnest, taking out the old shaft, with the blacksmith's aid, and by night had everything in good shape.

Next day we started for Crockers, over a fair road, dusty and rocky in parts, and always hilly, but the scenic beauties were such that we forgot our past troubles and felt we were amply repaid. We arrived at Crockers late that night, and early the next morning started out for the Yosemite. For five or six miles the road was rolling and level, and then began a grade longer than Priests, but not so steep, excepting in one place, where we figured the grade was 26 per cent. in a stretch of about 100 yards. From Hamiltons to the top of this grade is a toll road, and at Crane's Flat, near the summit, we gave up our passes, for which they charged us two dollars. This climbing had been so constant that the supply of gasoline which we had with us was nearly exhausted, and, much to our surprise, we found when we arrived at Tamarack, a distance of five miles from the summit, that our gasoline had given out. We had climbed up to an altitude of 7,300 feet at the summit, and the rarefied air had played a trick with our carbureters.

It was about 5:30 o'clock when we got to this point, and, leaving the machines on the side of the road, we started out for the Valley, with an eighteen-mile tramp ahead of us. We arrived at the hotel about 11 o'clock, tired, dusty, disgusted and blaming ourselves for not carrying more gasoline with us. Next morning we discovered there were but five gallons of gasoline in the Valley. This we purchased, and a friend of ours volunteered to take us up to Tamarack, where the machines were. After filling the tank it was an easy matter to make the rest of the journey down hill for about twelve miles, and then five miles through sand on the floor of the Valley, which was from four to eight inches deep.

We found upon arrival that ours was the sixth machine that had ever gotten into the Valley, while according to reports 116 had started, and that of the six several were run by professionals.

We had ordered our gasoline shipped to the Valley before leaving, but through some misunderstanding and poor transportation facilities, it took that gasoline just exactly three weeks to make a journey of 120 miles from the railroad to Yosemite. We would not have received it then had it not been for many dollars spent in telegrams to the various officials connected with the stage companies, begging them to bring the fuel in on a passenger stage.

The return to San Francisco was without particular incident. We ran from the Valley to Crockers the first day, from Crockers to Priests the second, from Priests to Stockton the third, and the fourth night were home, after having made 500 miles in all, and with but one puncture on our machine, which occurred sixty miles from home.

The trip to Yosemite is not an easy one, and when we told people along the road what our intentions were they as much as said we were very foolish to make the attempt, that we might get through it, but it was ruination to a wagon, let alone an automobile. Horses along the road seemed to pay less attention than horses in the city.

The only place, after leaving Oakland, where repairs could be made was at Stockton, and when we left that city were forced upon our own resources for such repairs as were necessary, but with the exception of the driving shaft we were fortunate enough to have no accidents.

DOUGLAS S. WATSON.

San Francisco, Calif.

ST. LOUIS CAR BY THE MERCED RIVER ON THE FLOOR OF YOSEMITE VALLEY.

Carbureter for Two-Cylinder Motor.

Editor THE AUTOMOBILE:—

[108].—What in your experience is the best all-around carbureter suitable for a two-cylinder 14-horse-power motor? I am having troubles of my own with a car I am building, and, without throwing money away, trying every make in the market, thought you could help me out by some advice on the subject. W. N. G. C.

Asbury Park, N. J.

There are several good carbureters on the market, any of which would be suitable for your engine. Consult the advertising pages in this issue. Assuming that the ignition functions properly on your motor and that the valves are tight and timed right, you should have no trouble in getting a carbureter which would run your motor. It is taken for granted that the gasoline tank is placed higher than the carbureter if the feed is by gravity, or if the feed is by pressure that the pressure is sufficient to force the fuel into the carbureter.

You do not state what kind of troubles you are having. If your motor starts up when the carbureter has been "tickled" or "flooded" and slows down or stops immediately afterwards, it is due to insufficient fuel supply. This may be caused by too small a hole in the "nozzle" or "tip," or by the float being set so low that it does not allow the gasoline to rise in the nozzle high enough to be carried along by the ingoing air. Or again, trouble may be due to too much gasoline. A float set "high" will allow the gasoline to overflow at the nozzle and so give an excessive fuel supply. A large hole in the nozzle will produce the same effect.

You can find out if too much gasoline is being fed by first flooding the carbureter and then shutting off the gasoline from the tank. Next switch on the electric current and rotate the motor briskly for several minutes. When the motor is turned it will "suck up" the gasoline from the carbureter, and during the first few moments the mixture will be too rich to explode. As the motor continues to be revolved the surplus gasoline will be taken up until finally the proper mixture is reached, when the motor will begin to explode. It will be evident, therefore, that more gasoline is supplied by the carbureter than the motor can use.

Again, your motor may start up and run nicely on a wide open throttle, but will miss and finally stop when throttled down. When a motor acts in this manner, the carbureter is to blame, because it does not supply a uniform mixture at various speeds. To run your motor at any except fairly constant speeds it must be fitted with a "compensating" or "automatic" carbureter.

THE AUTOMOBILE

VOL. XI. No. 20

Published every Saturday by
THE CLASS JOURNAL CO.,
Flatiron Building, Madison Square,
NEW YORK CITY.

Cable Address - - - - Autoland, New York
Long Distance Telephone - 300 Gramercy, New York

SUBSCRIPTION RATES:

United States, Canada and Mexico, - One Year, $2.00
Other Countries in Postal Union, - One Year, $3.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS:

ENGLAND:—Iliffe & Sons, Limited, 3 St. Bride Street, Ludgate Circus, London, E. C.
FRANCE:—Boyveau & Chevillet, 22 Rue de la Banque, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

To Advertisers—Copy or changes in orders for advertisements should reach us not later than 5 o'clock p. m. Monday for the issue of Saturday following.

Copyright, 1904, by The Class Journal Company.

Entered at New York, N. Y., as second-class matter.

The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly).

Copies Printed This Issue, - - 12,000
" " Since Jan. 1, - 555,000

Close of the Racing Season.

Election day brought to a close in the North the most successful racing season that America has ever enjoyed. It was a fitting end, too; performances on that day at places as widely separated as New York and Denver established new records in both the light and heavy gasoline car classes, and resulted in completing on the final day the work of wiping the record slate clean in the gasoline class. To-day not a single track record in the gasoline car classes that was made prior to this year remains in the table. More than this, while record-breaking has extended through most of the season, all of the times now standing have been made on and after September 10, or within the last ten weeks.

Except in the middle-weight class, for cars weighing 881 to 1,432 pounds, almost all of the records are now held by American cars, the exceptions being the nine-mile record in the heavy-weight class and the records in the same class from fifty to sixty miles. These are held by Mercedes cars, and it is but fair to state that no one has gone for the records above fifty miles with an American car.

Since racing on the highway has so far been denied to us, with the exception of the Vanderbilt Cup race and the several hill-climbing contests, the efforts of our designers and constructors have been to produce cars especially adapted for the peculiar conditions surrounding this form of contest, and the supremacy of our machines over the best products of European skill in automobile building with which they have been in competition throughout the season is a matter in which we may take some honest pride. When prejudice and opposition have been broken down sufficiently to permit of the holding of many road races in this country, the same efforts and driving skill that have given American cars world supremacy on the track may be expected to put us on an equal footing at least with foreign machines and drivers on the road.

The record table reflects strongly the direction in which the greatest progress is being made. While all of the records for gasoline cars of all weights have been broken this season, records in the steam car division above five miles that were made in 1903 still stand, and no records have been broken by electric vehicles since September, 1903, and the ten-mile record in this class made in October, 1902, still stands.

✷

Railroad Rates and National Shows.

In connection with the National Shows the question of reduced railroad fares comes up every year, and it is one on which there seems to be a good deal of misunderstanding. It is not possible for the management of an automobile show to secure from railroads reduced fares, as the rules of the various passenger associations controlling traffic in various sections of the country do not recognize a show as an event entitling those participating to any special concessions. Conventions are recognized, however, and for this reason it is the aim of the management of the National shows and other interested bodies to set the dates for the annual gatherings of State or National organizations concurrently with the show dates. Negotiations are now in progress between the interested parties and the railroads, which if carried through will secure for members of the American Automobile Association a reduced fare to New York to attend a convention which will be held in the city during the show time, January 12 to 21, next.

Under this arrangement members will be able to purchase return tickets for one and one-third the regular one way fare. Any one can purchase such a ticket at the point of origin by paying the regular one way fare. Before leaving New York, however, the return privilege at the reduced rate can only be secured by the identification of the holder as a member of the A. A. A. to the satisfaction of the railroad agent specially detailed for that purpose.

Holders of such tickets who are unable to satisfy the railroad agent that they are members of the Association will have to pay the regular fare when returning home from New York. For those who are members there is no difficulty and little delay in complying with the special ticket requirements.

At previous shows in New York and Chicago other organizations have secured special rates in this way, and visitors who were not connected with these organizations purchased the tickets under the impression that the reductions in rates were made for the benefit of all visitors to the shows. This misunderstanding was the cause of a good deal of friction, and it is as well for those who contemplate a visit to either of the National shows to find out exactly under what agreement special rate tickets are issued to avoid subsequent disappointment.

✷

Durability of Light Cars.

Off-hand comparisons are frequently made between the ordinary American light car and powerful foreign machines as to serviceability and durability to the disadvantage of the former. Such rough and ready comparisons have, of course, no technical value. They are invariably made by persons who have only a very superficial knowledge of the facts, yet they often find a ready credence among those who know still less about the subject, such as intending purchasers who frequently mistake in a friend the mere ownership of a car for possession of accurate information. In this way often the sale of a car is influenced or the area of the erroneous views held by the laity is enlarged. The question of cost ought to interpose an insurmountable barrier to such comparisons, yet this is usually ignored, and even if considered is so complicated by tariff charges, special commissions, premiums and the like that it obscures rather than facilitates a true solution.

On the floor of a salesroom or a garage one type of car would be about as durable as another—in fact, the rate of deterioration would be greater the more refined and highly finished the construction. It is manifest, therefore, that it is the use to which a car is put that determines its durability, assuming that suitable materials of construction are employed, and we are now only considering well-built and representative types.

Usually the American light car is driven by the owner, who personally takes care of the minor repairs and adjustments, with, perhaps, slight mechanical training. He expects the car to do not what its designers fashioned it to do, but rather what he, the owner, intends it shall do. He runs the car at maximum speed on the level a large part of the time and the motor invariably at maximum speed on hills. Except in street travel the output of his power plant is kept near the maximum, and the structural strength of his car is tried to within measurable distance of the point of breakdown for the greater part of the time it is in operation. If fitted with a tonneau or auxiliary seat the car will be overloaded time and again. With such use on the

road and probably the minimum care in upkeep the car is expected to show no signs of disintegration.

In the case of the foreign car it is usually in the care of a more or less expert mechanic on the road and of a competent repairman when off. In use it is usually driven at far less than its maximum speed, which is impracticable in cities and very risky on the ordinary American country road. There is a large margin of reserve capacity in speed and load which is seldom drawn upon to anything like the extent that such reserve is availed of in the case of the lighter car, for in the latter it is practically non-existent.

Were the light car to receive anything like the nursing that seems to be the lot of its big brother the comparison we have referred to would be a fairer one. The Vanderbilt race gave a good illustration of what fate may overtake the big, powerful car when it is used regardless of the limitations of design.

✷

New York Show Space All Filled. The annual Automobile Show in New York, which opens January 12, promises to be by far the most important exhibition of American cars and accessories ever held in this country. It will cover a greater floor space than any previous automobile exhibition in Madison Square Garden, and as the foreign cars will not be on view in the Garden this year the space ordinarily occupied by these exhibits will be available for American cars. This will, of course, take away something of the "comparative" value of the show, yet at the same time there is the compensation that the domestic exhibit will be more representative, for the withdrawal of the foreign cars is the equivalent of an enlargement of the building. The serious problem that confronts the show management every year is not what to put into the building, but where to put it.

All the available space, including for the first time this year the restaurant upstairs, has been allotted, and there will not be much chance for eleventh-hour applicants unless some of those to whom space has been assigned find themselves unable to make an exhibit and transfer their holdings. No doubt there will be the customary complaint from those who failed to make application before the date set for apportioning the space. The show management is obligated, however, to consider the wants of those who applied in season and not to speculate on the probability of late arrivals. It can only act upon such applications as are before it, and its obligations to the trade and the public demand an equitable division of the available space among those who have applied, according to the relative importance of the exhibits.

The thriving little town of Williams, Ariz., now boasts of one automobile and two motorcycles.

CHICAGO MAGISTRATES SCATHINGLY CRITICISED.

Illinois Circuit Court Judge Says City Officials and Courts Defy State Tribunals by Enforcement of Automobile Numbering Ordinance — Suggests Tagging Strikers.

Special Correspondence.

CHICAGO, Nov. 7.—Another chapter has just been written in the automobile numbering and licensing situation in this city, which appears to be drawing to a climax. In granting a petition of *habeas corpus* by Chester A. Bangs, chauffeur for President John Farson, of the Chicago Automobile Club, who was arrested for violating the city ordinance requiring the carrying of license numbers on automobiles and fined $5 in Justice Prindiville's police court last Wednesday, Judge Hanecy, of the Illinois Circuit Court, scathingly criticised the police and city magistrates for enforcing a municipal ordinance which the Supreme Court of the State had declared void and for interpreting an injunction as they saw fit.

Having released the prisoner, who had declined to pay the fine in order to make a test case, Judge Hanecy said:

"There isn't any wonder that there are violations of the law by automobilists and other citizens when the lawyers, city officials and employees, police and justices of the peace set the law at defiance and put themselves above the law. This defiance of the law runs all through the fabric of the government, it seems. It must stop. It will stop some day, and in a way that will shake some of the higher officials as they have never been shaken before.

"The endangering of lives and property by automobiles is the underlying principle in the city ordinances, but because they do become dangerous is no reason why the decision of the Supreme Court should be violated. Then, in every one of the labor strikes, where there is far more damage done and more danger to the lives and limbs of citizens, often causing the destruction of life, why shouldn't the common council pass an ordinance that every man that belongs to a labor union should be tagged, so that whenever any violence or damage is committed the police could capture him?

"Then the police might have no more to do than to stand on some street corner and look at events with a long glass until they see a man with a number violating the law and then they could go over and arrest him. The comparison is not overdrawn. The principle is the same."

Referring to the answer of the city in the *habeas corpus* proceedings, in which Assistant Prosecuting Attorney George Kriete contended that the justice had acted under the theory that the injunction obtained by President Farson against the enforcement of the ordinance against himself or any other member of the club, did not apply to his chauffeur, Judge Hanecy replied:

"According to you, then, every justice of the peace and every police officer could review the actions of the Superior or Circuit Courts and interpret an injunction as they are pleased to. If you contend that an injunction is not effective unless it covers not only the man who got it, but all his employees and operating apparatus (and if it does not, then some justice of the peace or police officer could say, 'We'll review it and decide what it may cover'), then law couldn't exist very long or society couldn't exist very long if that would be the case.

"It isn't very strange that one justice of the peace should think that he has the right to review a case when the newspapers and so many others are doing it every day. It makes no difference whether an injunction is properly sued or not, it must be obeyed in any circumstances. The only remedy is to have it dissolved by due process of law."

The Supreme Court decision that no municipality has the right to tag or number any private vehicle was then recalled to mind by Judge Hanecy as being the opinion of the final tribunal of the state.

Prosecuting Attorney Kriete, for the city, was lectured for ten minutes when, in referring to the decision of the Appellate Court sustaining the injunction secured by A. L. Banker against the city, he inadvertently said that Banker had "procured" the decision.

"He did not 'procure' the decision, nor did any one else procure the decision," said the judge. "It was a decision given by the judges of the Appellate Court from a careful review of the case. I cannot permit such language in my court, nor can I permit you as a lawyer and sworn to respect the Appellate Court to speak in that way."

The city authorities, having been enjoined from enforcing the ordinance passed by the common council, recently endeavored to secure equivalent results by inducing the park boards, which operate under separate charters from the state, to pass rules prohibiting anyone from driving an automobile on the park drives or the boulevards belonging to the park system, which include Michigan avenue, Jackson boulevard, Washington boulevard, North Shore drive and Grand and Drexel boulevards, without a license and tag issued by the city authorities.

Following the issuance of this rule, some of the members of the Chicago Automobile Club secured an order enjoining the park boards from enforcing the rule. The park commissioners will carry the case to the Appellate Court, and if necessary to the Supreme Court. Meanwhile, to conciliate the city authorities, the majority of the automobile club members decided to voluntarily conform with the city ordinance notwithstanding the decision of the courts that it was null and void. And so the matter stands at present, after a bitter war waged through the last three years.

BAIL FOR AUTOMOBILIST.

Illegal Police Methods Lead to Needed Reform in New York City.

Police Commissioner McAdoo's recent order to all New York City police stations that $100 should be the maximum amount of bail asked of an automobilist arrested on the charge of exceeding the legal limit of speed was the result of a sharp encounter between an automobilist and the police, in which the police came off second best. The story is not without interest, the facts being as follows:

Deane Miller, of New York City, clubman and member of the Stock Exchange, was driving his automobile in town at what he states was a reasonable rate of speed and within the legal limit, when a young policeman charged him with running too fast and took him to the Twenty-ninth street police station, where the case was laid before the sergeant in charge—a man who, Mr. Miller said, seemed to have no consideration for those unfortunate enough to be brought before him. Miller had $100 in his pocket and at once proffered it as bail; but, to his surprise, the sergeant refused to discuss the matter of bail at all, and ordered

him locked up. The prisoner protested vigorously but vainly, and was locked in a cell which is mildly described as filthy. After keeping Mr. Miller in the cell for an hour and a half the sergeant demanded $300 bail. The money was sent for, but in the interval before its arrival the sergeant, apparently awakening to the fact that he was carrying the matter with too high a hand, offered to release his prisoner on $100 bail. Having made up his mind, however, that the sergeant was not doing what was right, Miller insisted that the $300 should be accepted, which was done.

Mr. Miller lost no time in consulting W. W. Niles, counsel for the Automobile Club of America, who advised him, before taking other steps, to see if the police authorities would not deal with the matter as it seemed to deserve. Accordingly, a complaint, setting forth the details of the case, was made to Police Captain Cottrell, who promptly gave his decision in favor of the sergeant, and giving Miller no satisfaction. Failing in this, an appeal was made to Commissioner McAdoo, who took a more serious view of the matter, and named November 3 for a trial of the case, and in the interval issued the order fixing the cash bail of speeding automobilists at $100.

Assistant Commissioner Lindsley heard the case. The sergeant made as hard a fight as he could, bringing an attorney to defend him and all the policemen who had been in any way connected with the matter to act as witnesses in his behalf. He protested that Miller had only been in the cell twenty minutes, to which Assistant Commissioner Lindsley replied that it was the principle involved and not the time the prisoner was locked up, that was in question, and that if Miller had been locked up for only twenty seconds the principle would have been the same as if he had been incarcerated for a week. "The whole question," said Mr. Lindsley, "is whether or not the sergeant refused bail and locked up the automobilist." As it was impossible for the sergeant to even attempt to deny that he had done both of these things, he was found guilty, sentence being suspended.

In the course of his defence the sergeant declared that Miller had confessed to the policeman who made the arrest that he had previously been fined for speeding in his automobile.

When the policeman was placed on the stand, however, he testified that Miller had made the statement concerning a previous arrest to the sergeant during the examination. The conflicting stories were at once noted by the Assistant Commissioner, and his demand for an explanation thoroughly confused the witness. Miller stated that, as a matter of fact, he had never before been arrested for speeding.

Had the sergeant acted rightly when Miller was brought before him, he would have accepted $100 as bail, or he could have accepted the automobile in default of cash bail, but he cut short Miller's attempt to discuss bail by sending him to a cell.

"Mr. Miller deserves a great deal of credit, I think, for the courageous manner in which he has carried the matter through," commented Mr. Niles. "Many automobilists who have had dealings with the police know what it means to oppose them as Mr. Miller did. He was not acting by any feeling of personal spite or desire for revenge, though he naturally felt much put out at the treatment he had received. He is not a member of the Automobile Club of America, and fought single-handed, believing it his duty as a citizen and an automobilist to test the matter legally.

Owners of 212 automobiles have registered in Milwaukee under the new automobile ordinance.

DEWAR TROPHY OFFERED.

Sir Thomas Authorizes Handsome Gift for Florida Mile Record Race.

Invitations and entry blanks for the Ormond-Daytona tournament, to be run January 23 to 28 inclusive, under the management of the Florida East Coast Association, will be ready for distribution November 13, and entries will close Friday, January 13. Twenty-five separate events are scheduled in the list sent out this week by W. J. Morgan, New York representative of the association at 116 Nassau street, New York. All entries for the events will be by invitation only, the F. E. C. A. A. having adopted a resolution to that effect at its annual meeting.

Additional interest will be given to the tournament this year by the donation of a trophy by Sir Thomas Dewar, M. P., of London, who cabled last week to Mr. Morgan to see his American representative, Frederick Glassup, and arrange for the details of the gift. The new trophy will be put up for the international record mile race, and teams representing the different countries will compete for it. Heats will be run by countries, the winners of the heats coming together in the final. It is asserted that the new trophy will be the handsomest and most costly ever given in an automobile event in America, designs by leading silversmiths of New York and submitted to Mr. Glassup calling for a magnificent trophy. The deed of gift is to be made public in a few days.

Besides presenting this trophy, Sir Thomas has promised to be present at the tournament and to act as associate referee with A. R. Pardington, of the American Automobile Association racing board, and S. A. Miles, of the National Association of Automobile Manufacturers.

Next in importance to the international mile record race will be the 100-mile race for the W. K. Vanderbilt, Jr., prize and the ten-mile American derby for the Hotel Ormond prize. The time trials that were proposed for November have been added to the January program and gold medals will be presented to the winners in the different classes. The list of events is as follows:

1. One hundred miles, open to all, for the Vanderbilt trophy. In case the number of starters exceeds six the cars will be started one minute apart and the winner determined by time instead of by position. In this case the start will be from a standstill.
2. One-mile Record International, open to all, for the Sir Thomas Dewar trophy. Two cars in each heat; second round of heats if necessary; winners and fastest car to compete in final.
3. Fifty miles, open to all, American built cars. In case the number of starters exceeds six the cars will be started one minute apart and the winner determined by time instead of by position, in which case the start will be from a standstill.
4. One mile, for steam cars only.
5. Five miles, for steam cars only.
6. Ten miles, for steam cars only.
7. Five miles, time trials, stock cars, above $1,000 to and including $1,800.
8. Five miles, time trials, stock cars, above $1,800 to and including $2,750.
9. Five miles, time trials, stock cars, above $2,750 to and including $4,000.
10. Five miles, time trials, stock cars, $4,000 and over.
11. Five miles, time trials, racing cars of all classes.
12. Five miles, gasoline stock cars, $650 and under.
13. Five miles, stock cars, above $650 to and including $1,000.
14. Ten miles, stock cars, above $1,000 to and including $1,800.
15. Ten miles, stock cars, above $1,800 to and including $2,750.
16. Ten miles, stock cars, above $2,750 to and including $4,000.
17. Ten miles, stock cars, $4,000 and over.
18. Ten miles, Ormond Derby, open to all racing cars.
19. Five miles, handicap, stock cars only. Open only to those cars which have been entered for and have taken part in events Nos. 7 and 8.
20. Five miles, handicap. Open only to those cars which have been entered for and have taken part in events Nos. 9, 10 and 11.
21. Five miles, Great Ormond Handicap. Open only to the first five cars in events Nos. 19 and 20.
22. Fifty miles, Daytona Handicap, open to all.
23. Ten miles, Mercedes trophy.
24. Fifteen miles, open to 40-horsepower cars or under.
25. Gymkhana race.

Stock cars must be equipped as catalogued, except that lamps, baskets and tops need not be carried; must carry tonneau if adapted. Foreign cars must be qualified according to American catalogues. No entry will be accepted unless catalogue is available.

In the five-mile handicap, event No. 21, stock cars must be equipped as herein specified and exactly as in events Nos. 19 and 20. The management reserves the right to refuse any entry for events for stock cars which, in its opinion, is not a stock car within the meaning of this rule.

One trial only will be allowed in time trials. The final heats of handicaps will be re-handicapped if, in the opinion of the handicapper, any change is desirable. All events except handicaps, and those otherwise specified, will be from flying start.

SOUTHERN RACING CIRCUIT.

Good Tracks in Louisville, Nashville, Memphis and New Orleans.

Special Correspondence.

MEMPHIS, Tenn., Nov. 7.—While eastern and northern automobilists are struggling with muddy roads and cold winds, their brethren in the South are enjoying the best of motoring weather. There has been but one rain since September 1 in Memphis, and the roads are as near perfection as they ever get. Automobile interest is greater in this city now than ever before. Trade is brisk and the owners of the machines are making new converts every day.

Interest is being revived in a scheme for a Southern racing circuit, embracing Louisville, Nashville, Memphis and New Orleans, which will give the racing men a good series of engagements during the winter months. The four cities mentioned have tracks well adapted to automobile racing, and great interest could easily be developed. Race meets have been held in all of these cities, and all have been successful. Nashville pulled off two highly successful meets during the summer, and the enthusiasts there will flock by thousands to another.

There is a fine track in Louisville, but Memphis is more fortunate than any of the other cities, for it has the famous Driving Park track owned by the Memphis Trotting Association, which is the fastest track for light harness horses that the world has ever known. This track, while not banked to any great extent, has wide turns, and great speed could easily be maintained on it.

The Cumberland Park track at Nashville demonstrated that it is well adapted to the use of racing machines during the two meetings this summer, when high speed was attained.

New Orleans has two tracks, one ready for business at any time and the other nearing completion. The New Orleans Jockey Club track in particular should be especially well adapted for automobile racing, as it has wide turns and is well banked.

If automobile racing is introduced in the South and properly conducted it ought to be a big success, as the southern people are great lovers of racing, and the weather in this section never becomes so severe that out-door automobile meetings could not be held.

RECORDS FALL AT DENVER.

Oldfield with "Green Dragon," Makes New Figures Up to Twenty Miles.

World's track records for almost all distances up to and including twenty miles were broken by Barney Oldfield, driving the Peerless *Green Dragon*, at Overland Park, Denver, Col., on Saturday, November 5, and Tuesday, November 8. The broken records include the mile figures set up by Earl Kiser—52 4-5 seconds—which Oldfield reduced to 52 1-5 seconds. He altered the figures for all distances up to twenty miles, with the exception of the record for nine miles, which is 8:17, made by Charles Basle in the Bowden Mercedes in Providence on September 10 last; and his own ten-mile mark made at the four-cornered match race at the Empire track, Yonkers, N. Y., on November 29. This remains at 9:12 3-5. Twenty miles was covered at Denver in 18:45 2-5, the previous record, by Kiser, having been 19:8 2-5. Oldfield's own records from eleven to fifteen miles, made with the *Bullet*, were broken, as were also Kiser's records from sixteen to twenty miles, made with the same car. The new figures, from one to eight miles, are as follows:

One mile, :52 1-5; two miles, 1:46; three miles, 2:41; four miles, 3:33 1-5; five miles, 4:30; six miles, 5:25 1-5; seven miles, 6:18 1-5; eight miles, 7:13 1-5.

The trials were sanctioned by the Racing Board of the American Automobile Association, and the records will stand as official.

FERRYBOAT TEST CASE BEGUN.

Whether or not the automobile has a legal right to run on and off of ferry boats under its own power will be decided by an action commenced on November 9 in the United States District Court, New York city, by United States District Attorney H. L. Burnett, who filed a libel against one of the boats of the Brooklyn Ferry Company. An automobile was run on and off the boat under its own power, on October 14 last, for the purposes of the suit, under an arrangement with the ferry company, and the filing of the necessary papers followed. The ferry company will be defended by Herbert Green, of the firm of Wilcox & Green, New York.

One of the new Reo cars of the Reo Motor Car Company, Lansing Mich., will be tested shortly, if the weather is favorable, by a run from the factory at Lansing to New York City, a total distance of about 1,000 miles. Sales Manager R. M. Owen, of New York, has gone to the factory to make arrangements for the trip. In addition to the runabout, the Reo Car Company will manufacture a 16-horsepower car weighing 1,400 pounds and capable of carrying five persons. The transmission is said to embody some entirely new features.

SCHOOL IN WORCESTER.

Course of Lectures and Laboratory Demonstrations to Begin November 16.

Special Correspondence.

WORCESTER, Mass., Nov. 7.—The Young Men's Christian Association of Worcester is to conduct an automobile school on lines similar to those successfully employed by the Boston Y. M. C. A. last season.

The school will open on the evening of November 16, and the course will consist of thirteen lectures, supplemented by twelve laboratory or shop demonstrations and at least three quizzes on the automobile work of the shop course.

Both the lectures and laboratory work will be divided between gasoline and steam as motive power, six of the lectures being exclusively on the gasoline machine, two pertaining to both, and four especially devoted to steam.

The Worcester automobile school has been fortunate in securing as its superintendent Parker H. Kemble, who is also at the head of the Boston school.

The shop work will be conducted at the laboratories of the Worcester Polytechnic Institute, which are second to none in the country. The work will be under the supervision of Charles M. Allen and D. L. Gallup, both members of the Worcester Polytechnic Institute faculty; and F. P. Barker and E. J. Loring, both of the Boston automobile school.

The Worcester school will be conducted by the educational department of the Y. M. C. A. under the direction of an advisory board, including a number of gentlemen actively connected with the automobile industry and pastime.

NEW YORK Y. M. C. A. SCHOOL.

Course of Instruction in West Side Branch Opened November 9.

Students to the number of 136 have been enrolled for the automobile school at the West Side Y.M.C.A., 318 West Eighty-seventh Street, New York. The formal opening occurred Wednesday evening, November 9, when Winthrop E. Scarrit, president of the Automobile Club of America, addressed a gathering of about 250 young men, all interested in the automobile as professional drivers, prospective chauffeurs, or prospective owners. Most in evidence, however, were the prospective chauffeurs.

Mr. Scarrit's address was listened to with attention, and that a large proportion of his audience had an acquaintance with the practical side of automobiling was indicated by the appreciative applause which invariably followed a reference to some familiar situation. Much practical advice was given along general lines, and in addition, the lecturer went into his subject from a historical point of view, concluding by taking his hearers somewhat into the future when, he declared, the standardization of the automobile would make it the necessity of the many, rather than the plaything of a few.

Addresses on the educational work of the automobile classes were given by W. M. Kingsley, chairman of the committee of management; H. S. Colburn, educational director; and Walter L. Hervey, Ph.D. Some disappointment was occasioned by the announcement that the operative classes were so completely filled that no more students could be enrolled for three months. There is still room, however, in the draughting and lecture classes for a small number of students.

Clarence Bowne Brokaw, who has charge of the operative course, began work on Wednesday by delivering two lectures on automobile construction, a car being at hand for the purpose of illustration. The practical use of the automobile will form part of the work, and lectures will be arranged at hours found most convenient for the students. Charles E. Lucke, Ph.D., of Columbia University, will deliver an illustrated lecture, the first of a series, on Wednesday evening, November 16.

PLANS OF NEW YORK MOTOR CLUB.

The New York Motor Club, which was temporarily formed on October 29, held a called meeting at Bretton Hall, Eighty-sixth street and Broadway, New York, Wednesday evening, November 9. S. A. Miles presided and L. R. Smith acted as temporary secretary.

After much discussion, the name "New York Motor Club" was finally adopted. It was also practically decided to fix the annual dues at $20 for resident members and $10 for non-residents. Non-resident members shall be persons residing more than fifty miles from New York City.

The following were appointed a committee to draft by-laws and constitution to be submitted for adoption at a meeting to be held at the same hall next Wednesday evening: C. H. Hyde, Frank J. Griffin, A. L. McMurtry, I. B. Potter and J. E. Wetmore.

One of the interesting features of the new club in its efforts to promote the interest in automobiling will be a series of lectures on automobile subjects which will be given at intervals throughout the year, these being delivered by men prominently identified with the trade and sport, who will be invited for the purpose. After disposing of the business in hand, the meeting adjourned and an informal luncheon was served.

Among those present were L. J. Hall, A. L. Pope, H. J. Lozier, C. C. Boynton, A. L. McMurtry, H. W. Pratt, C. H. Hyde, E. D. Gray, J. H. Amory, Joseph Cowan, Frank J. Griffin, W. J. Morgan, J. J. Prial, E. D. Stratton and A. G. Batchelder.

SPEED ORDINANCE UPHELD.

Ohio Supreme Court Refuses to Review Case Carried Up from Lower Courts.

Special Correspondence.

COLUMBUS, Ohio, Nov. 7.—The Supreme Court of Ohio has handed down a decision sustaining city ordinances regulating speed of automobiles. The decision was given in the case of Campbell M. Chittenden, who was fined $25 and costs for speeding his automobile recklessly. He attacked the validity of the ordinance under which he was convicted, taking the case from the police court through the various courts to the highest tribunal of the State, which refused to allow him to file a petition in error, thereby upholding the lower courts and compelling him to pay the fine.

The case involved a social war between leading families of the State capital. The proceedings were instituted by William G. Deshler, as the result of an accident to his daughter, caused by a horse taking fright at Mr. Chittenden's machine. Both parties to the affair are leaders in the social and financial circles of this city.

The Calais to London autoboat race for next year has been set for July 15, and intending American competitors are requested to make note of the date. Inquiries for information should be addressed to the Automobile Club of France, in Paris.

AWAITING DECISION ABOUT RENTED CARS.

Boston Police Board Hears Arguments of Dealers Against City Licensing and Fixing of Rates — Asked Pertinent Questions on Other Subjects.

Special Correspondence.

BOSTON, Nov. 7.—Boston dealers are awaiting with interest and some anxiety the decision of the police board of the city regarding the licensing and fixing of uniform rates for hire of automobiles rented by the hour, day and week. The board gave the dealers a hearing on these questions last Wednesday, and it is expected that in a few days a decision will be made public.

Word was passed among the automobilists that the police board proposed to put rented automobiles on the same plane as hackney carriages, and the members of the dealers' association, whether accustomed or not to renting machines, got together to oppose such a move. They went to the hearing fortified with counsel and prepared with data and arguments to show, first, that licenses should not be required, and that no rate table should be promulgated, and second, if the board took such action, to show why the rates should be high.

Among those at the hearing were A. E. Morrison, representing the Peerless; George H. Lowe, the White; Harry Fosdick, the Winton; W. J. Foss, the Pope; J. H. MacAlman, the Locomobile; Benjamin Smith, the Olds; C. E. Fay, the Winton; C. S. Henshaw, the Thomas, and others.

At the opening of the hearing Judge Emmons, chairman of the board, announced that the board did not favor the cab-drivers' contention that the letting of automobiles should be prohibited. He believed the automobile business to be a very great industry and one that might in time drive out the hackney carriages just as the electric cars drove out the horse cars. But if automobiles are rented to the public, the police board has the right to require licenses and fix rates in Boston. He said that it was clear, owing to the cost of the cars and the expense of maintenance, that the rates, if fixed, should be higher than for hackney carriages.

Prescott F. Hall, attorney for the Olds company, quoted a District of Columbia decision to show that automobiles that are rented should not come under the law for hackney carriages. He claimed, also, that the fact that the Legislature has made a separate law for the registration of automobiles, and the licensing of chauffeurs indicates that it considers them in a separate class from other vehicles. Mr. Hall also mentioned the cost of repairs of automobiles and Judge Emmons replied: "Yes, we know all about that; we have two automobiles in the police force."

The hearing then resolved itself into a general discussion of rates. Counsel for several concerns, and a number of different dealers, favored a rate of $10 for the first hour and $5 for each succeeding hour, with a minimum day rate of $25 or $35. Mr. Smith, of the Olds company, who is renting machines for $3 for the first hour and $2 for each succeeding hour, said that he made that low rate largely for advertising purposes.

Besides the discussion of rates, the dealers took the opportunity to ask some other questions of the board. Mr. Lowe wanted to know how long he could leave his machine by the curbstone in a city street. The chairman told him that he could leave it five minutes unattended or twenty minutes with an attendant. Harry Fosdick asked if the board had power to require that all vehicles carry lamps at night, and the judge told him that the board did not have that power. At the end of the conference the chairman said that the board would consider the question and would make known its finding later. It will also include in its annual report some recommendations for future automobile legislation.

WASHINGTON SHOW SANCTION

N. A. A. M. Recognizes Promoters of Former Exhibitions, Now Incorporated.

Special Correspondence.

WASHINGTON, D. C., Nov. 7.—A sanction has been given the Washington Automobile Dealers' Association to hold an automobile show from March 27 to April 5. Efforts were made by a number of dealers outside the association to have the sanction set aside, but after carefully considering the matter the National Association of Automobile Manufacturers refused to take the sanction away from the local body, which has promoted every show held in this city.

The local association has just been incorporated by B. C. Washington, jr., Isaac Thorne, and George Bentley, jr., with a capital stock of $1,000, to regulate the conditions upon which automobiles shall be bought and sold, the rate of commissions thereon; for the storing and repairing of automobiles; to promote and conduct an annual trade show or shows for automobiles in the District of Columbia; to promote and regulate automobile races in the District of Columbia and elsewhere, when properly sanctioned by the recognized racing board of the United States."

The officers of the association are: Royce Hough, president; Chas. E. Miller, vice-president; R. W. Cook, treasurer; B. C. Washington, jr., secretary. All the officers are members of the trade, with the exception of Mr. Washington, who is a government clerk.

The association does not comprise the full strength of the local trade, three or four very prominent firms being outside it. It is said they will not be represented in the show.

DETROIT SHOW PLANS.

Entire Main Floor of Armory Building to Be Given Up to Automobiles.

Floor plans and full information pertaining to the Fourth Annual Automobile and Sportsmen's Show at Detroit, February 13 to 18 inclusive, under the management of the Tri-State Automobile and Sporting Goods Association and sanction of the National Association of Automobile Manufacturers, have been issued.

Pleasing changes have been made in the arrangement of spaces. The main floor of the Light Guard Armory will be reserved exclusively for automobiles, while the gallery will be floored over flush with the rail and devoted to the display of automobile accessories and sundries. The rear door of the Armory will be rebuilt and a platform put in so that the largest cars can be moved in readily.

The first allotment of spaces will be made November 28. Application for blanks and diagrams should be made to Seneca G. Lewis, secretary, Post Office box 58, Detroit.

The Imperial Wheel Company has concentrated its forces in a new plant in Flint, Mich., having discontinued the use of the factory at Jackson, Mich.

MOTOR TRUCK CO. FORMED.

H. A. Knox Heads New Concern Which Will Erect Large Plant at Once.

Special Correspondence.

SPRINGFIELD, Mass., Nov. 8.—The Knox Motor Truck Company has just been organized under the laws of this State with a capital of $100,000, and preparations are on foot for the immediate erection of a manufacturing plant in the Brightwood section of Springfield, which will be the largest and best-equipped factory for the construction of commercial motor vehicles in the country. A tract of land containing about 65,000 square feet has been purchased as the site of the new plant. This land has a railroad frontage of 350 feet, and the factory to be built will be complete in every detail, and will have machinery of the latest type.

Harry A. Knox, who has recently disposed of his interest in the Knox Automobile Company, with which firm he had been connected since its formation four years ago, will be president and general manager of the new company. Mr. Knox is an expert in the mechanical construction of motor vehicles, and to his genius much of the progress of the Knox company has been due. With him in the new undertaking will be associated Walter S. Pease as vice-president, and Clarence J. Wetsel as treasurer. Mr. Pease has in the past been connected with the Electric Vehicle Company of Hartford, Conn., and for the last five years has been connected with the Knox Automobile Company, and closely associated with Mr. Knox in his experimental work. Mr. Wetsel is at present treasurer and manager of the Baush Machine Tool Company of this city, and has wide experience in the financial management of mechanical industries for twelve years.

Ground for the new plant will be broken at once. The contracts call for its completion and equipment by March 1, 1905. Arrangements have been made with the Baush Machine Tool Company for the use during this interval of part of its plant, and the construction of commercial vehicles will be begun at once. The factory will have a floor space of about 75,000 square feet. When completed the shops will employ between 300 and 500 skilled workmen.

BUICK SECURES LARGER PLANT.

The Buick Motor Company, of Flint, Mich., has increased its capital stock to $300,000, fully paid in, and has taken possession of the factory recently vacated by the Buick Motor Company at Jackson, Mich., which will be used for the work of assembling and finishing automobiles. The building consists of a main structure, of 375 feet frontage and 85 feet deep, two stories high, and three wings, 900 feet, 600 feet and 300 feet deep respectively and each 80 feet wide and one story high. In addition, there is a large area of outbuildings and sheds. Railroad sidings aggregating about one mile in length are laid in the grounds, which cover an area of 17 1-2 acres. The Buick factory at Flint, Mich., which occupies a building 200 feet long and 65 feet wide, will be doubled at once. This plant will turn out the motors and transmissions.

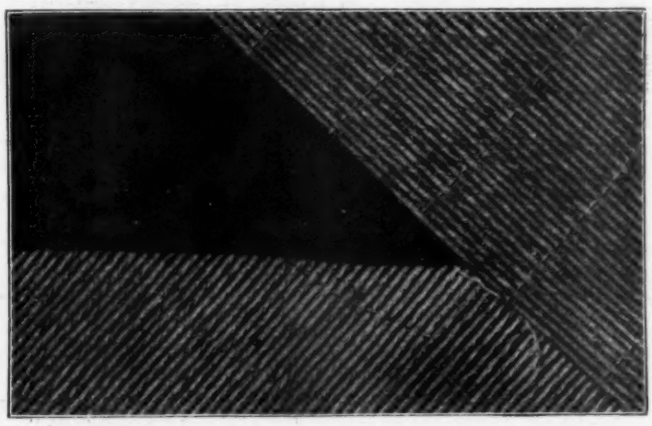
Percy F. Megargel, formerly sporting editor of the Rochester *Post-Express,* and who made two tours from New York to the World's Fair last summer in the Elmore *Pathfinder,* has accepted the position of advertising manager with the E. R. Thomas Motor Co., of Buffalo.

INFORMATION FOR BUYERS.

G & J Thread Tires.—The G & J Tire Company, Indianapolis, Ind., is now making its tires with a fabric specially woven, with the object of making every thread do its full quota of work while insulated, so to

CROSS SECTION OF G & J FABRIC TIRE.

speak, from the adjoining threads by a coating of rubber, which at the same time serves to bind the fabric to the rubber outer covering. The manufacturers state that with the ordinary "square woven" fabric formerly used in these tires—fabric in



FABRIC OF G & J TIRE SHOWING CROSS LAYERS OF THREADS.

which the threads were all of the same size and strength—the threads were under unequal tension, those lying in one direction being under great strain, while the cross threads were under very slight tension. The threads also set up a great deal of friction where they crossed, destroying one another and at the same time generating heat which was deleterious to the tire. In the new tires the threads are so placed that all are under equal tension, and the angle at which they cross, also a matter of importance, is correct. The fact that each individual thread is completely coated with rubber prevents the threads from coming into actual contact with one another, and at the same time affords protection from moisture, in case of a cut, to all except the threads actually injured, as there is no chance for the water to spread through capillary attraction and cause rotting. Thread tires, the makers state, have proved themselves more durable and resilient than those made with ordinary fabric, causing the tires to stand up in road service until worn out, rather than hasten their own destruction by internal chafing.

Neverskip Spark Plug.—A folder issued by the Post and Lester Company, Hartford, Conn., illustrates in a practical manner how the Neverskip spark plug is taken apart, besides giving a lot of information about the good points of the article. The metal parts of the plug are made of brass, and special attention is given to the finish. The insulation consists of mica, a mica ribbon being wound on spirally, and over this mica washers are strung, being subjected to very heavy pressure. No shellac or other binding agent is used. A large chamber is formed in the body of the plug to provide the self-cleaning feature.

Non-Fluid Oils.—The New York and New Jersey Lubricant Company, of 14-16 Church street, New York City, and 79 Ninth street, San Francisco, states that, whereas three out of every four drops of fluid oil fed to friction surfaces in automobiles are not worn out, but wasted, the N. Y. & N. J. non-fluid lubricants remain on the bearings until their lubricating qualities are exhausted, not only reducing the waste, and consequently the expense of lubrication, but keeping the machine and its environments cleaner. A special non-fluid oil made for gear cases is thick enough so that it will not leak out, but at the same time will permit particles of metal to sink to the bottom instead of grinding between the rubbing surfaces. One filling of non-fluid gear case lubricant is said to be equal to three fillings of fluid oil.

Combination Volt-Ammeter.—The Robert combination volt-ammeter manufactured by the Detroit Electric Company, 56 Shelby street, Detroit, Mich., has a diameter about the same as that of a good-sized watch, and

ROBERT COMBINATION VOLT-AMMETER.

is a convenient instrument for testing primary or storage batteries. It is said to be almost "dead beat"—that is, the needle will come to a dead stop when a current is passed through the instrument, with very little oscillation. The voltage and amperage are indicated and may be read at the same time. The instrument is said to contain no delicate springs or other parts liable to get out of order, and is fully guaranteed. It comes in a leather case.

Running Gear.—The accompanying illustration shows one of the several styles of pressed steel frames manufactured for the trade by H. F. Borbein & Co., 2108 N. 9th St., St. Louis, Mo. The front axle is 1 3-8 inches square, and the wheels run on taper roller bearings. The artillery wood wheels have steel hubs with brass caps, hickory spokes and hickory felloe, upon which steel clincher rims are shrunk and bolted to receive 4-inch clincher tires 34 inches in diameter. The rear wheels are provided with sprockets for side chain drive and with brake drums. The wheelbase is 100 inches and the tread standard. The steering gear is of the worm and gear type. The entire gear is hung unusually low, it having been built originally for a manufacturer who intended to use it for a racing machine.

BORBEIN RUNNING GEAR WITH PRESSED STEEL FRAME.

INDEX TO ADVERTISERS

Acetylene Gas Illuminating Co.....39
Acme Motor Car and Repair Co.....36
Acme Motor Car Co.....61
Allyne Brass Foundry Co.....46
Altemus & Co., C. L.....37
American Automobile and Power Co.....36
American Ball Bearing Co.....47
American Coil Co.....37
American Darracq Automobile Co.....61
American Lamp Works.....38
American Machine Mfg. Co.....38
American Oak Leather Co.....39
Anderson Mfg. Co., J. C.....45
Anderson & Sons Co., W. H.....46
Angier Co., The.....37-38
Association of Licensed Automobile Mfrs..59
Atwood Mfg. Co.....39
Audel & Co., Theo.....36
Auto Body Co.....44
Auto Car Equipment Co.....49
Auto-Rebuilding Co.....39
Automobile Supply Mfg. Co.....38

Badger Brass Mfg. Co.....51
Bartholomew Co., The.....58
Bay State Stamping Co.....37
Becker, John.....37
Belle City Mfg. Co.....46
Biddle & Smart Co.....48
Big Four Railroad.....40
Black Diamond Automobile Co.....Cover
Bliss-Chester Co.....38
Blomstrom, F. H., Motor Co.....42
Boston Automobile Exchange.....38
Boston Gear Works.....39
Bowser & Co., S. F.....47
Brennan Motor Co.....44
Briscoe Mfg. Co.....57
Brooke, M. E.....39
Brooklyn Automobile Co.....36
Byrne-Kingston Co.....52

Cadillac Automobile Co.....64
Central Automobile Co.....58
Chandlee & Chandlee.....43
Chicago Battery Co.....43
Chicago Rawhide Mfg. Co.....42
Clark Carbureter Co.....49
Clyde Line.....40
Columbia Automobiles.....36
Continental Caoutchouc Co.....55
Covert Manufacturing Co.....39
Crane, George A.....36
Crucible Steel Casting Co.....46
Cullman Wheel Co.....39
Custer Beam Works.....45

Davis Robe Co.....53
Dayton Electrical Mfg. Co.....44
Detroit Steel Products Co.....44
Detroit Electric Co.....39
Dietz, R. E.....Cover
Dixon Crucible Co., Jos.....45
Dolson & Sons, John L.....64
Dow Portable Electric Co.....37

Draper Bros. Co.....37
Duerr-Ward Co.....36
Dyke, A. L.....39
Dyke Automobile Supply Co., A. L.....39

Eldredge Electric Mfg. Co.....37
Electric Storage Battery Co.....45
Elmore Mfg. Co.....59
England, I. W.....36
Excelsior Supply Co.....37

Fast, Otto.....49
Federal Manufacturing Co.....46
Fisk Rubber Co.....52
Fitz Gerald, James L.....40
Ford Motor Co.....70
Forg, Peter.....46
Franklin Mfg. Co., H. H.....65
Funke, A. H.....50

Gilbert Manufacturing Co.....38
G. & J. Tire Co.....56
Goodrich Co., The B. F.....54
Goodyear Tire and Rubber Co.....53
Gray & Davis.....50
Grout Bros. Automobile Co.....36

Hardy Co., The E. R.....45
Harris Oil Co., A. W.....40
Hartford Pattern and Model Co.....46
Hartford Rubber Works.....Cover
Herz & Co.....38
Hjorth Wrench Co.....37
Hopson & Chapin Mfg. Co., The.....46
Howarth & Rogers Co.....48

Induction Coil Co.....45

Jeffery & Co., Thomas B.....Cover
Jersey Brake Co.....51
Jones Speedometer.....50

Kells, W. J.....39
Knox Automobile Co.....66

Lackawanna Railroad.....60
La Roche Co., F. A.....61
Leather and Brass Works.....43
Leinbach Bros.....58
Levy & Co., Manasseh.....37
Light Manufacturing and Foundry Co.....46
Lobee Pump and Machinery Co.....38
Locke & Co.....44
Locke Regulator Co.....39
Locomobile Co. of America, The.....63
Lowell Model Co.....49

Manufacturers' Foundry Co.....46
Matheson Motor Car Co.....Cover
McCord & Co.....37
McKinnon Dash Co.....34
Meisel Press Mfg. Co.....46
Meyercord Co., The.....38
Meyrowitz, E. B.....39
Michigan Automobile Co.....65
Miller, Charles E.....52
Miller, Knobloch Electric Co.....45
Milwaukee Auto Engine and Supply Co....48
Moore & Son Co., M. E.....45
Morgan, W. J.....58
Morgan & Harding.....39
Morgan & Wright.....54
Moss Photo-Engraving Co.....57
Motor Boat and Sportsman's Show.....42
Motor Car Equipment Co.....45
Motor Car Supply Co.....38
Motor and Mfg. Works Co.....48
Munsell & Co., Eugene.....38
Myers, A. J.....49

Nash Pump Co.....42
National Compounding Co.....38
National Motor Vehicle Co.....61
National Sewing Machine Co.....47
Neudstadt Co., J. H.....50
New Process Rawhide Co.....43
Northwestern Storage Battery Co.....45
Nuttall Co., R. D.....45
N. Y. and N. J. Lubricant Co.....38

Oakes & Dow.....38
Ofeldt & Sons.....38
Ophthalmuscope Co.....38
Oriental Hotel.....59

Packard Electric Co.....37
Packard Motor Car Co.....68
Parish & Bingham Co.....52
Pederson, J. T.....39
Peerless Motor Car Co.....67
Pioneer Brass Works.....46
Pittsburg Reduction Co.....46
Pope Motor Car Co.....60
Post & Lester Co.....43
Post Mfg. Co.....42
Power, J. J.....40
Premier Motor Mfg. Co.....59
Providence Steel Casting Co.....46

Quinby Co., J. M.....48

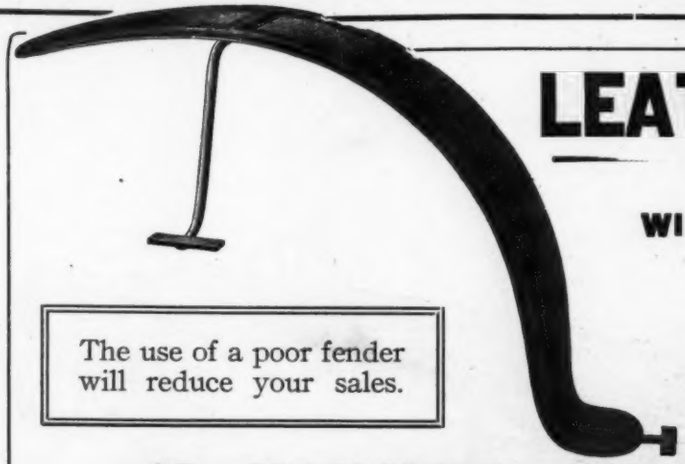
Randall, F. E.....36
Rattan Novelty Co.....38
Reading Metal Body Co.....48
Reid Mfg. Co.....57
Riley & Co., Wm. B.....43
Riverside Body Factory.....48
Rochester Automatic Oiler and Supply Co..38
Rotary Motor Vehicle Co.....49
Royal Equipment Co.....37
Royal Motor Car Co.....62
Rushmore Dynamo Works.....50
R. & C. Indicator Co.....43

Saks & Co.....35
Samson Leather Tire Co.....53
Scoville & Peck Co.....51
Skat Manufacturing Co.....37
Smith Co., A. O.....44
Smith & Mabley.....71
Splitdorf, C. F.....45
Sprague Umbrella Co.....48
Springfield Hat and Cap Co.....37
Springfield Metal Body Co.....48
Springfield Moulding Works.....39
Standard Automobile Co.....69
Standard Supply Co.....39
Steam Carriage Boiler Co.....39
Stitch-in-Time Vulcanizer Co.....42
St. Louis Motor Carriage Co.....45
Streit Machine Co., A.....49

Taylor, Geo. R.....37
Thomas Motor Car Co., E. R.....63
Thorn Manufacturing Co.....37
Timken Roller Bearing Axle Co.....47
Torbensen Gear.....47
Traufault-Hartford Co.....38
Trebert Auto and Marine Motor Co.....49
Trebert Gas Engine Co.....49
Tucker, C. F.....37

Ullman, Henry J.....36
Union Automobile Co.....57
United Electrical Mfg. Co.....37
United Motor Corporation.....36
Upton Machine Co., The.....46
Upton Motor Co.....40

Vanderbeek Tool Works.....42
Veeder Manufacturing Co.....48
Vehicle and Implement Spring Co.....46



LEATHER FENDERS

which look best at first and last longest

WILL BE USED THIS SEASON

in place of metal fenders which rattle.

The use of a poor fender will reduce your sales.

THIS IS **IMPORTANT** TO YOU

McKINNON DASH COMPANY

TROY, OHIO. CINCINNATI, OHIO. BUFFALO, N. Y. ST. CATHERINES, ONTARIO.